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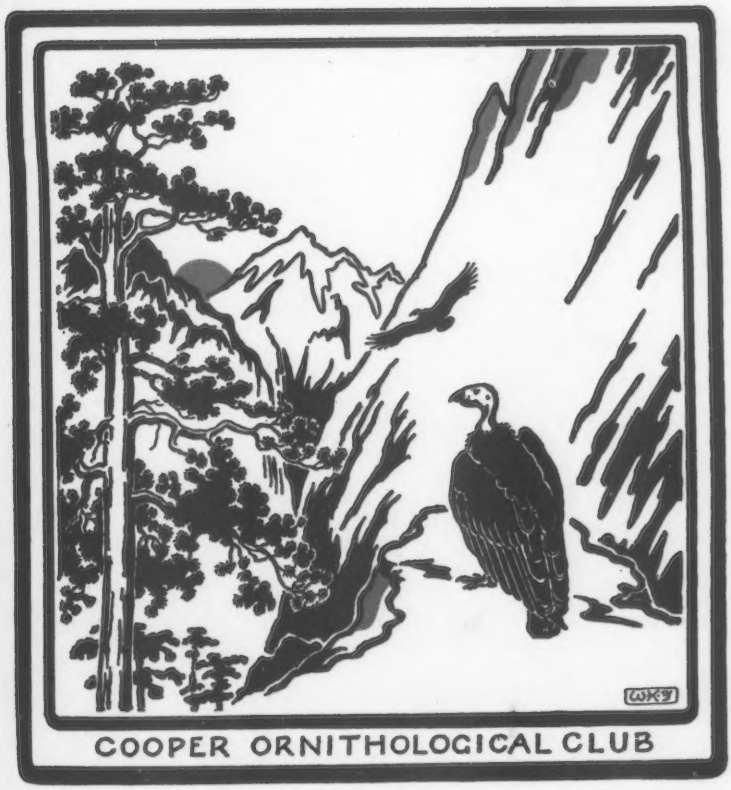
THE CONDOR

A Magazine of Western Ornithology

Volume 44 July-August, 1942 Number 4



THE CONDOR

A Magazine of Western Ornithology

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THE CONDOR

VOLUME 44 JULY-AUGUST, 1942 NUMBER 4

THE NEST LIFE OF THE TURKEY VULTURE

By TELFORD HINDLEY WORK and ALBERT JOHN WOOL

For several years we have been interested in the nesting of the Turkey Vulture (*Cathartes aura*). Opportunity to study a nest in detail came in the spring of 1940 when we discovered a site in southwestern Alameda County, California. The senior author was employed during the summer and consequently several of our visits to the nest in June and July were at night after working hours. Time and expense limited our observations.

The following is a summary of some of our observations. We wish to express special appreciation to Dr. W. H. Rich of the Stanford Natural History Museum for his help, encouragement, and enthusiasm for the work we were doing. Others who have aided greatly are: J. R. Fassett, R. F. Connett, W. Wool, D. Grant, and Harvey I. Fisher.

In the spring of 1939 we flushed a Turkey Vulture from a hollow-log nest in Buzzard's Canyon, about 26 miles northeast of Paso Robles, San Luis Obispo County, California. The log, which had been hollowed out by fire, was in a horizontal position in a growth of sage brush which camouflaged it. The stump end was buried in the south-facing slope of the hill; the other end was open. Entrance to the nest was possible through this open end and through an aperture on the top of the log about four feet from the end. With the aid of a flashlight we could see two downy vultures in the end of the hollow which was filled to a depth of 14 inches with odoriferous and white-washed debris. The young birds, about six days old, were bobbing up and down and occasionally emitting a weak, muffled hiss. This nest was not used in 1940.

A nesting site in the steep wall of Arroyo Hondo, several miles southeast of Calaveras Dam, in Santa Clara County, was found in early June of 1937. The "nest" was in a large dark cave and contained a single young vulture. The site was more exposed to the light and weather than the one described below.

The nest with which this study is chiefly concerned was found on April 16, 1940, in a sandstone cliff approximately 15 miles northeast of San Jose, California. The cliff is one-fourth mile long and has a maximum height of 130 feet, but the height near its south end where the nest was situated is 100 feet. On a clear day one can see open country for several miles to the west and south. The slopes surrounding the cliff are covered with wild oats and sage brush (fig. 51). Occasional clumps of live oak, toyon and poison oak are found on the slopes, and these plants are abundant in near-by shallow ravines. Black-tailed deer are abundant; on our daylight trips we never saw fewer than a dozen.

The entrance to the nest cave is twenty feet from the base of the precipitous cliff. The opening is only two feet wide and a little higher; inside it opens out into a large chamber eight feet in diameter. In the ceiling of the chamber is an opening to the outside, and six feet from the entrance, in the rear of the chamber, is a pit nine feet deep and three and one-half feet wide. This pit gradually narrows to a diameter of two feet at the bottom. The floor of the chamber is irregular and is strewn with rocks of various sizes. On the other hand, the floor of the pit is sandy and has a slight

Fig. 51. Nest cliff used by Turkey Vultures in 1940; 15 miles northeast of San Jose, California.

covering of twigs, stones and fossil shells which have been deposited there by water coursing through the cave in the rainy season. There was no "imported" material used in the nest in the pit. At the bottom are two small passageways which lead off opposite sides of the pit. These escape-ways furnished opportunity for some interesting observations which we made later in our study of the young birds.

Within the pit it was impossible to see more than the boundaries of the cavern even after one's eyes became accustomed to the darkness. Our observations on this nest and others, as well as published accounts, lead us to think that the Turkey Vulture prefers dark, secluded places in which to rear its young.

At right angles to the small entrance is a larger opening which leads to a ledge on the cliff. The ledge is also the entrance to another funnel-like cave which extends far back into the cliff. At its deep end this cave becomes very small before enlarging to form a chamber. The smallness of this inner entrance shuts out almost all light in the chamber. Two eggs of the Turkey Vulture were found here in 1937. Nests found on this sandstone cliff were never situated in the same place in successive years except once, but the eggs or remains of eggs found there in 1936, 1937, 1939 and 1940 may have been laid by the same bird.

The single exception occurred in 1941 at the same nest that was observed in 1940. On April 20, 1941, Wilbur Wool and Telford Work returned to the cliff to examine this nest. On entering the cave, a strong vulture odor was evident and further examination of the pit showed the form of a vulture on the nest. After taking several photoflash pictures, the bird failed to move. Work crawled down and brought the vulture to the upper chamber. It was dead and in such a state of decomposition that it was impossible to identify it as the same bird that nested the year before. One fresh egg was found in the nest. There was no evidence that the bird died of egg-binding. It had probably been dead for two weeks.

The first indication we had of a Turkey Vulture nest in the cliff in 1940 was the sight of a bird emerging from the opening in the top of the nest chamber. Examination of the cave revealed two eggs which were "stone cold," and candling of the eggs with a flashlight showed that they were fresh. We left immediately in order that the parent might return. Knowing that birds are less likely to desert a nest after incubation has started, we decided to return later for photographs.

On the afternoon of April 19 we again flushed the old bird from the nest and climbed to the cave. Just inside the entrance was a mass of dark-colored, partly digested meat which evidently had just been regurgitated by the parent we had frightened from the nest. The eggs had been moved back toward the wall of the pit. While we were near the cave the old bird soared high in the air, but it always remained within half a mile of the cliff.

On our next visit, on May 1, we crept silently along the base of the cliff to a position where we could photograph the bird as it left the nest. When the equipment was set up, we made a commotion to frighten the bird out of the cave, but no bird appeared. We climbed to the cave. The eggs were not stone cold but neither did they feel as though they had been incubated recently. Candling revealed that they had been incubated, but the development seemed slight for the fourteenth day of incubation. A dark red embryo could be seen through the shell, but it was only one-tenth the volume of the egg. Large blood vessels were formed next to the shell, and everything was still quite fluid within the egg. This early stage of the incubation, the temperature of the egg, and the absence of the parent caused us to wonder if the nest was deserted. On leaving the cave in the late afternoon we noticed two Turkey Vultures soaring over the canyon at the level of the cliff.

Albert and Wilbur Wool returned to the nest on the afternoon of May 12. Albert Wool's field notes read: "As we started to climb to the narrow opening, we heard the old vulture struggle against the steep walls of the funnel as she abandoned her eggs. A moment later, with wings awkwardly scraping the sides of the upper opening, she pitched out and soared across the valley, only to return and circle about nearby."

Since the round trip from Stanford University to the nest is an 85-mile, 8-hour affair, we planned to delay the next visit until the eggs had hatched. Published estimates of the incubation period for Turkey Vultures range from 30 to 40 days. By comparison with birds of comparable size we calculated that 31 days would be about the correct period. We returned on May 17. Wool climbed to the nest while Work remained below to photograph any ensuing action. The old bird did not flush and we were afraid the eggs had been deserted.

The parent had remained on the nest! Looking down into the pit with the aid of a flashlight, we saw the old bird flattened out on the sandy floor with its head turned sideways to watch us. Under its neck and chin was an unhatched egg, and near the egg was a recently hatched chick which was entirely white except for its black head and feet (fig. 52). The chick's eyes were not opened, and its neck was too weak to

Fig. 52. Adult Turkey Vulture crouched over egg and newly hatched chick.

support the head which was lying sideways on the ground. We expected the parent to make a move at any moment, but we took pictures (one at 16 inches) and stroked its feathers without causing it to move. The old bird crouched lower when we set off the flash bulbs and from time to time it blinked its eye and emitted a few guttural hisses. The chick moved only once or twice and tried to raise its head. It hissed almost inaudibly two or three times. The remaining egg was pipped, and the bill of a chick was protruding from a hole in the under side of the egg. As we left the cave, another Turkey Vulture flew past the entrance.

On the afternoon of May 19 the white fluffy chicks were somewhat apart from the adult when we first peered into the pit. Almost immediately the parent moved a few paces up the escape passage to the left and regurgitated an odoriferous piece of meat eight inches long and about an inch thick. The old bird, which we knew to be the same one observed previously because of a dark red blotch behind the right eye, remained hunched over the meat until we forced it out into the pit for a photograph with the young. In the pit it again assumed the flattened position, hugging the ground with the head turned to one side. The hisses were more forceful and drawn out on this visit.

Fig. 53. Adult vulture with downy young on May 19, 1940.

The most obvious change in the young birds, aside from a 100 per cent increase in their size, was the longer, more attenuated bill. Two days previously the bill had been short, and the head had been relatively wide between the eyes. The white down covering the young was long, the skin was black, and the feet were large as compared with the rest of the body. Figure 54 shows the black skin on the bare ventrum. As in subsequent visits we noticed that one chick was much smaller and weaker. Both tired easily. Early in the visit they hissed occasionally, but later they were quiet and the smaller bird could not hold up its head.

We returned for our third observation of the young on May 29, when they were 13 days old. They were approximately four times as large as they were on the last visit and were much stronger. They hissed continually, but alternately. If we turned the lights off, they stopped, but they resumed immediately when the lights flashed on. As we descended into the pit, their hisses became more frequent. At a distance of three feet they hissed simultaneously and awkwardly spread their wings. When we stopped moving, they stopped hissing, but the least disturbance caused them to start again. This spreading of the wings for defense and balance was the first sign of co-ordinated use of the wings. One chick backed up into a corner and used its right wing

as a brace to maintain an upright position. In moving about the floor of the cavity the chicks rested on the entire length of the tarsus as well as on the foot. In a resting position they sat on their haunches with the legs extending forward.

Handling preparatory to weighing excited them and they regurgitated. The process of regurgitation started with an undulating movement that began at the feet, passed through the entire body and was climaxed by a forward projection of the neck and head. As the meat passed from the bill, the eyes were closed. On most occasions regurgi-

Fig. 54. Young vultures at age of thirteen days.

tated meat was not eaten again; the cave was splotched with such material. However, larger pieces of such meat may be eaten. Several times we tried without success to find pieces that had been regurgitated previously.

We realized that weights of the young birds would be affected greatly by this regurgitation and, consequently, we forced them to regurgitate completely before weighing on this and other visits to the nest. On this date, May 29, the larger chick weighed 380 grams and the smaller 340 grams. It was possible to differentiate the chicks in these early visits because the larger had a thick, heavy covering of down on the head; the smaller one's head was only sparsely covered.

Upon our entrance into the pit on May 29 the parent which had been with the young moved into the left escape passage and remained there until we brought it out into the pit. Once in the pit the bird covered the chicks, one under each wing, and settled down into the flattened position. When the adult was stroked, nothing hap-

pened; ruffling of the feathers produced no reaction. After several minutes the chicks crawled out from beneath the old vulture (fig. 54). We removed them to the upper chamber for weighing. While we had them there, we brought the parent up and set it free near the entrance to the cavern. Instead of escaping to the outside the bird scrambled back into the pit. It neither struggled nor hissed when handled, and the crop was empty.

An attempt at what we thought was feeding occurred on this visit. The parent regurgitated food into the open mouths of the young.

On the afternoon of June 1 the parent was not observed. The two young birds were squatted down on the nest in the pit. Lengthening of the head was again apparent, even though the elapsed time was only three days. The nostrils were beginning to assume the adult shape, and along the posterior edge of the wing the quills of the primaries were about one-fourth inch long. In the three-day interval the chicks (now 15 days old) had increased their weight more than one-third. The larger weighed 550 grams, the smaller 485 grams. Part of this increased weight may have been due to the retention of food. The young birds seemed more accustomed to us, and only one piece of meat was regurgitated. They did not retreat as often or as far from us as on previous visits. However, it may have been that they were bolder and more antagonistic. Co-ordination of wing and leg action was much improved. The young birds showed a noticeable desire to be next to something. When they were up against a wall, they did not try to move farther although a way of escape was possible. The large chick once squatted, seemingly content, next to Wool's knee, and when we put them in a leatherette equipment case to move them for weighing, they did not want to be removed.

We had noticed feathers of Turkey Vultures and whitewashed areas on ledges near the cave and thought the other parent might roost there at night. Although our approach at 9:00 p.m. on June 6 was cautious, we saw no vulture outside the cave. The same (?) parent walked into one of the escape ways off the pit and disappeared from sight. Now, at the age of 20 days, the larger chick weighed 1010 grams and the smaller 820 grams. In five days they had increased their weight by more than 40 per cent. The primary quills were one-half inch long, and the down was beginning to curl. The bills had assumed adult proportions and had a well shaped hook on the tip of the upper mandible. The skin was still black, but the feet and legs were lighter in color than on former occasions.

A much bolder attitude was exhibited by the young birds. They hissed continually and squatted on their haunches in a threatening manner with wings partly extended and trailing on the ground. When a hand came near, they attempted to nip it, and twice the smaller bird succeeded. An increased ability to balance the body was shown by the vultures when they were placed on the scales or were held high on a hand.

Early in the afternoon of June 11 we visited the nest site again. No Turkey Vultures were observed in the vicinity of the cliff. The young birds were alone in the bottom of the pit. The larger weighed 1030 grams, a gain of 20 grams in five days; the smaller chick had gained 39 grams and weighed 859 grams. The longer quills of the primaries were one and one-half inches in length and barbs were beginning to appear at the tips. Quills for tail feathers and some body feathers were first noticed at this time. The downy covering of the body had become coarse, long and very curly. The shape of the head was that of the adult.

Although they exhibited no particular antagonism toward us, the young vultures were extremely antagonistic toward each other. When forced into close quarters, they lunged at one another and hissed loudly. In a series of these actions they occasionally came in contact. Then one or both would suddenly be repelled backward, as if by some explosive force. As a rule the larger bird dominated the smaller. The smaller was finally

forced back into the right passage leading from the pit. This passage had never been used by the adult or the chicks to our knowledge. When we attempted to extricate it, the bird worked back out of sight.

While weighing the vultures near the entrance, we noticed seven Turkey Vultures soaring past. Oftentimes they came within twenty feet of the opening, and as they did

Fig. 55. Young twenty-five days old.

they turned their heads toward the cave entrance. When Work went outside, they paid no particular attention to him and continued to soar near the cliff.

It was 1:30 in the morning of June 29 that we next visited the nest. We were greeted by the familiar chorus of hissing as we approached the cave. Although the young vultures were approaching adult size, they were still quite downy. The tail feathers were long, and the flight feathers were well developed all along the wing. On the shoulder the feathers seemed to have grown more rapidly than on the rest of the body; they were as long as some of the primaries. The black feathers of the wing, shoulder and tail contrasted markedly with the white down covering the rest of the body (fig. 56).

The two young birds were at first frightened by our presence. The smaller one escaped up the right passageway, as it had done on the last visit. When we brought it back into the pit, it continued its efforts to escape by attempting to climb the steep walls of the pit. Once it performed what we have termed a "scare rush." This action starts with a slow hiss accompanied by a rapid forward projection of the head. When the neck is extended part way, it is jerked back and a violent concluding hiss is emitted.

Simultaneously the wings are thrown forward. This creates a startling flash and a rush of air. On this occasion the whole performance was bluff, for the bird never followed through with an actual attempt at contact. The larger chick became quiet later in our visit and moved up next to us as it had done several times on other visits. We examined the cliff surrounding the cave but could find no trace of the adults.

Fig. 56. Young at age of six weeks.

Our last trip to observe and photograph the young Turkey Vultures was made on July 18. When we arrived at 12:30 p.m., no vultures were in the cave, but with the aid of a flashlight we found the young vultures in the adjoining funnel-like cave described earlier. They were perched on the rocks; at the moment the wings were almost fully extended (fig. 57). Although they still retained the downy white head covering, the down on the neck and breast was interspersed with black feathers. The skin was still black, but the feet were light in color. The wingspread was four and one-half feet.

As we approached, the small bird retreated, but the large vulture stood its ground and regurgitated. We placed the large bird in a hollow near the mouth of the cave and went back to recover the other bird which had continued to retreat, walking backward and watching us constantly. When we placed the two birds together in the depression in the floor, an "explosion" resulted. The small bird scrambled over the edge of

Fig. 57. Young ready to leave nest cliff.

the cliff and fell to a ledge three feet below. Meanwhile, without using its wings, the larger vulture had climbed a twelve foot perpendicular wall of rock to another ledge. We know of no explanation for this abrupt reaction when the two young birds came together, but we had seen it several times before. Each time it was the smaller bird that was routed unceremoniously.

Attempts to recover the smaller vulture failed. When Work approached the ledge on which the larger bird was resting, it started backing away. This bird had never retreated before, but this time it continued moving away and stepped off the ledge backward. It fell for some distance before making any visible effort to fly. Then the right wing was flapped once, then the left, but the bird continued to fall until the wings started flapping in unison. It flapped for a short distance and then soared to a landing in the valley below, about one-half mile away. This was undoubtedly its first flight.

Three days later Wool visited the cliff; the smaller vulture was gone.

SUMMARY

Thirteen visits were made to a Turkey Vulture nest in Alameda County, California, in the spring and summer of 1940. The nest was situated in a dark cave in a sandstone cliff facing the southwest. Two fresh eggs were found on April 16; hatching occurred

on May 17, an elapsed time of 31 days. When an adult was in the cave, it was always the same individual. When sitting on the eggs the vulture was easily flushed, but for two weeks after the eggs hatched it would not leave the young even when we were in the cave and handled it.

The first primary quills were observed at 15 days of age; the first development of rectrices was observed at 25 days. Lengthening of the bill to adult proportions was a striking feature of development. In the last month that the young birds were in the nest, they were antagonistic toward one another, and the small bird was dominated by its larger nest mate. At 62 days the larger bird was forced to fly; the other flew before 65 days. Maximum increase in weight occurred between the fifteenth and twentieth days.

Stanford University, California, March 15, 1942.

THE BROWN JAY'S FURCULAR POUCH

By GEORGE MIKSCH SUTTON and PERRY W. GILBERT

Travelers along northeastern Mexico's modern highway are apt to remark upon the scarcity of bird life. Those who motor at reasonable speed from Monterrey to Victoria, and thence to Mante, Valles, and Tamazunchale, are sure to see, and almost sure to hear, however, a crow-sized, dark gray-brown bird, with longish tail, that inhabits the brush of the low country. This bird is in no way handsome, but its boldness, simple coloration, and obvious predilection for the roadside insure its being noticed and talked about. It belongs to that tribe of mischief makers, the Corvidae. It is the Brown Jay, *Psilorhinus morio*.

Fig. 58. Brown Jay (*Psilorhinus morio*), about one-fifth life size. Drawing by George Miksch Sutton.

The Brown Jay almost never goes about alone. Family groups of five or six are the rule, although sometimes when an owl, lynx, human being, or other enemy species is being mobbed, a party of twenty or more may congregate. Excitement then runs high. Each jay must approach "the enemy" as closely as it can, so as personally to confirm the "rumors" it has heard. Each jay must scream. If "the enemy" moves, the outcry momentarily stops short; the jays eye each other as if pondering the next move; and the hubbub of screaming starts afresh.

When the senior author first encountered the Brown Jay in the vicinity of Monterrey, Nuevo León, in February of 1938, he was greatly struck with what he called the bird's "hiccup." This sound, which usually was heard just at the close of the customary scream, but often quite independently of it, was not unlike the syllable *puck* or *huck*. Although not loud, it was distinctly audible at a distance of several yards, particularly when the jays, hopping from branch to branch overhead and peering curiously downward, ceased from their outcry. It had a snapping or popping quality, and careful observation disclosed the fact that the bill was usually, if not always, slightly open when the sound was produced.

The hiccup was caused not by some oesophageal spasm, but by the sudden inflation (or perhaps deflation) of a curious little pouch on the jay's chest. Although hidden by the throat and breast feathers and therefore usually not visible in the living bird, this pouch was readily perceptible the instant a freshly killed specimen was squeezed. Now filling to capacity with air, it sprang up, lifting and pushing the feathers aside, only to collapse slowly. A sudden squeezing might even cause it to "pop" faintly.

Description of the pouch.—Cursory examination of the pouch disclosed the fact that, when fully expanded, it was spherical and about three-quarters of an inch in diameter; it was tough, faintly powdery in appearance, and sparsely covered with small down-feathers, and when deflated, it occupied the interclavicular space just in front of the sternum. During the course of preparation of study skins it was found to be virtually unskinnable, for the dermis adhered closely to the subcutaneous tissues. The whole structure was, therefore, liberally treated with borax and allowed to dry as a pouch.

All specimens of Brown Jay collected by the senior author and his co-workers in 1938, 1939, and 1941 were found to possess this pouch. Birds of both sexes and those in full juvenal feather possessed it. In May of 1941 an adult male collected by Robert B. Lea in southwestern Tamaulipas was preserved in formalin and brought back for detailed laboratory study.

Dissection of this specimen clearly shows the pouch, which has been called the "cervical sac" (Crandall, Zoologica, 1, 1914: 336-337), to be directly connected with the interclavicular air sac. Since the term "cervical air sac" is in current use for two of the nine major air sacs of most birds (the Brown Jay included), the authors propose that Crandall's term "cervical sac" be replaced by "furcular pouch."

At this point a brief statement concerning a bird's air sac system is in order. The system usually consists of nine sacs—all of them connected with, or accessory to, the lungs—two cervical, two anterior intermediate, two posterior intermediate, two abdominal, and the single, unpaired interclavicular. The last-named sac is adherent to the syrinx and lies ventrad, laterad, and craniad to this organ. From it rise four pairs of diverticula—the subscapular, axillar, suprahumeral, and sternal. In the Brown Jay there is still another—a prominent, unpaired, median diverticulum which lines the furcular pouch described above.

The pouch in the specimen at hand measures five-eighths of an inch in diameter, is wrinkled, and, except for a few small down feathers, is quite naked. Its orifice meas-

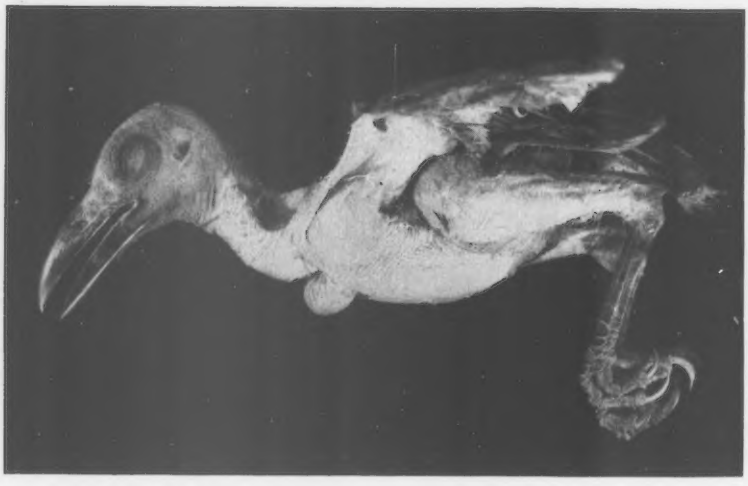

Fig. 59. Ventral and lateral aspects of plucked specimen of *Psilorhinus morio* showing furcular pouch. Photographs by Art Smith.

ures slightly more than one-fourth of an inch in diameter and may be enlarged or reduced respectively through the relaxation or the contraction of the two cleido-trachealis (=cleido-thyreoideus) muscles. These muscles (see fig. 60) originate on the cranial face of the wishbone for a distance of five-sixteenths of an inch on either side of the

interclavicle, pass laterad and craniad around the base of the furcular pouch, and about one-third of the way up the neck become intimately associated with the integumentary muscles. Beyond this point they again free themselves from the skin, pass along the ventral side of the trachea and ultimately insert on the superior lateral border of the larynx, the basal part of the ceratobranchials, and the lateral borders of the basihyal.

By way of comparison, two other corvids (courteously furnished by William E. Bostwick and Stephen W. Eaton) were dissected—a Crow (*Corvus brachyrhynchos*) and a Blue Jay (*Cyanocitta cristata*). In these species the cleido-trachealis muscles were found to be not nearly so well developed as in *Psilorhinus morio*. In the Crow, a larger bird than the Brown Jay, they were much thinner and narrower, not only relatively, but actually. The fact that neither the Crow nor the Blue Jay possesses anything comparable to a furcular pouch suggests the possibility that in the Brown Jay the cleido-trachealis muscles have hypertrophied in correlation with the development of this remarkable structure.

Histological study.—Although the available material was not ideal for histological study (it had been fixed in weak formalin), sections from both the ventral and lateral walls of the pouch were stained with various reagents. Sections treated with Mallory's

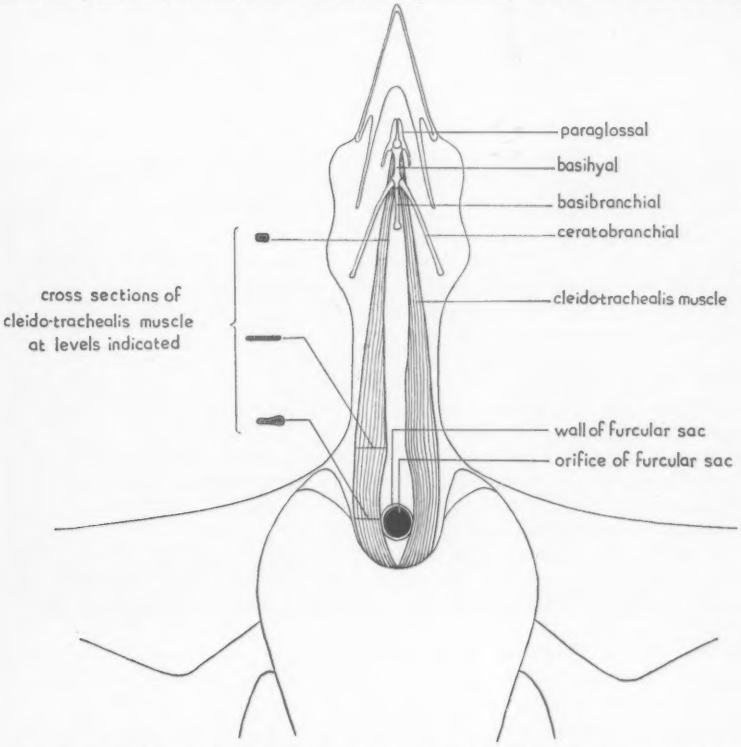

Fig. 60. Ventral aspect of *Psilorhinus morio* showing relationships of cleido-trachealis muscles to orifice between furcular pouch and interclavicular air sac. Drawing by Perry W. Gilbert.

connective tissue stain revealed that the wall consists (from outside to inside) of a layer of integument, an adipose layer, a layer of connective tissue, and a thin, non-ciliated, cuboidal epithelial lining. The ventral wall, because of its relatively heavy layer of adipose tissue, is considerably thicker than the lateral walls. Neither smooth nor striated muscle was detected. Weigert's resorcin-fuchsin stain revealed the fact that elastic fibers, though present, were no more abundant than might be expected in ordinary white fibrous connective tissue. These facts lead the authors to think that the pouch does not contract through action of any intrinsic muscular elements, but that it simply collapses, the air passing from it into the interclavicular air sac during expiration. The speed with which air leaves possibly is regulated to some extent by the cleido-trachealis muscles, but it is doubtful if these muscles ever completely shut the orifice.

The hiccup as part of the Brown Jay's vocabulary.—The senior author is well acquainted with the Brown Jay's habits. At the Rancho Rinconada, near Gomez Farias, Tamaulipas (headquarters of the 1941 Cornell University-Carleton College Expedition), the species was abundant. The four members of the expedition were wakened almost daily by the jays, who learned that if they came early to a certain bedroom window and screamed incessantly they could rouse the human beings within.

During these early morning visits the hiccup was used as part of the bird's vocabulary just as definitely as were the scream and other purely vocal sounds. The hiccup was a signal for quiet, for stealthy approach, for close attention to some not quite solved problem. Whether the birds could scream without hiccupping was questionable; but hiccupping without screaming was a common practice. The jay's colloquial nickname, *Papán*, more than likely arose as an imitation of this sound.

The bird student or hunter in southern Tamaulipas is almost certain to be accompanied by a troop of Brown Jays wherever he goes. This is sometimes very annoying, for the birds are apt to be most obstreperous when quiet is most desired. Shooting a jay will sometimes cause the posse to disband. The hunter may now proceed unattended for a time; but he is sure to be rediscovered and the loud-voiced birds gather from all directions as if, completely oblivious to huntsman and gun alike, they were compelled by instinct to rally at a given signal.

If the hunter keeps carefully under cover, he may move about without the jay cortège. Perhaps he sits down to wait for quarry. A jay may approach him, hiccup plainly, hop closer. Other jays may come, each of them hiccupping. If the hunter remains motionless and partly shuts his eyes, the whole flock may examine him, hiccup over him at some length, and pass on without a scream. It takes a certain poise and determination to undergo these inspections. There is a great temptation to turn the head a bit so as to watch the flock. But let the hand move or the eye wink and *pee-ah! pee-ah!* the alarm sounds—and bedlam breaks loose.

So the hiccup is a Brown Jay word. It is produced not by the syrinx but by a pouch that looks like a crop and that connects directly with the bird's interclavicular air sac. Did the pouch come into being because the Brown Jay needed it, or did it evolve quite by chance, persisting because it in no way adversely affected the bird's welfare? The only answer to questions such as these is that the Brown Jay is obviously a successful species; that its anatomy and habits must therefore have been conducive to, or at least not detrimental to, species survival.

Taxonomic significance of the pouch.—Early ornithologists apparently failed to notice the Brown Jay's pouch. This was probably because they had no opportunity to study the living or unskinned bird. Rüppell (Mus. Senckenbergianum, 2, 1837: 188-189), who named and described the genus *Psilorhinus*, as well as the species *Psilorhinus*

mexicanus, made no mention of it. Wagler (Isis von Oken, 7, 1829: column 751), in his description of *"Pica morio,"* gave an account of a yellow-footed individual, but said nothing of the pouch. Lichtenstein's brief description of *"Corvus morio"* included nothing pertaining to the species' anatomy (Preis-Verzeichniss, 1831: 1; Jour. für Ornith., 11, 1863:56). George Robert Gray, in his "Genera of Birds" (1849: 307-308), presented a good drawing of the head in profile, the bill (from above), the primaries, and an outline of the foot, but there was no description nor drawing of the pouch. Neither R. Bowdler Sharpe (Cat. Birds Brit. Mus., 3, 1877:4-8) nor Robert Ridgway (Birds N. and M. Amer., 3, 1904:255) made any mention of the pouch in keys to the genera of the Corvidae.

As Crandall (*loc. cit.*) has clearly pointed out, the pouch is present both in *Psilorhinus mexicanus* and in *P. morio*. No one appears to have called attention to the fact, however, that no other corvid possesses such a structure, and that it therefore is probably the most valid single character whereby the genus *Psilorhinus* may be recognized. Many another corvid in the Old World as well as the New has wholly or partly uncovered nostrils, average bill and feet, long or longish and more or less graduated tail, and a color pattern wherein the head and upper parts are dark and the belly and under tail coverts are white. But among corvids the Brown Jay's pouch appears to be unique; the air sac diverticulum contained therein apparently is unique; and the whole structure cannot be dismissed as superficial.

Should the Brown Jays constitute a genus by themselves? In answering this question the authors would like to express their general disapproval of weakly characterized genera, and their particular disapproval of monotypic genera in families of more than one genus. Why maintain such a category as the genus at all unless it be to show, through grouping, that certain forms are related? The answer to the original question, then, is this: The furcular pouch of the Brown Jay is not necessarily a generic character. But if the genus *Psilorhinus* be maintained, the pouch is the most valid character the group possesses.

Department of Zoology, Cornell University, Ithaca, New York, March 23, 1942.

THE STATUS OF THE NORTHWESTERN CROW

By ALLAN BROOKS

Whether the Northwestern Crow (*Corvus caurinus*) is entitled to full specific rank has long been a matter of controversy among ornithologists. Mainly the difference in opinion has been between those who are familiar with it in life on the one side and on the other those whose verdicts are arbitrarily based on the evidence of the millimeter rule without regard to life characters.

The committee of the last A.O.U. Check-list decided that it is only a subspecies of *Corvus brachyrhynchos* without regard to the records of the many naturalists who have been familiar with it in the field during the last century. Nor have these arbiters conformed to the principle that any two forms that breed in the same area and keep distinct must be different species.

No! Because the measurements overlap, the birds must be conspecific. I have not measured a large series of each kind and so am not in a position to disprove that the measurements do overlap, but I might suggest that it would be easy for specimens of *brachyrhynchos* to be mixed with a series of *caurinus* and labeled as the latter species. In many localities the two species may be found together, not only on their feeding grounds in winter but also in a breeding area. I have seen both nesting in the same locality on Sumas Prairie, British Columbia, the same area where J. K. Lord found them in 1856, but unlike that somewhat erratic observer I could find no difference in the structure of their respective nests. This particular locality has since been completely altered in its physical characters; the two species may not be nesting together there at the present time.

The main distinction between these two crows, as recorded by many observers, is in their voices. The ordinary *caw* in the Northwestern Crow is of a higher pitch; in addition this species has a musical cackle, *wok-wok-wok-wok*, which I have never heard from *brachyrhynchos*. This cackle is not a song note but a flock call, usually heard as the straggling flocks are following some line of movement. It appears to be a rallying call to keep individuals in touch with each other. A somewhat similar call may be heard in the spring as uttered by the American Crow, but this is more of a gurgle—a song in fact. But what has impressed me more than any voice distinction are the actions of the Northwestern Crow; it has a different personality. These crows are more sociable and are governed by the community instinct. A flock may be feeding on the shore, when suddenly they launch themselves into the air in a compact group, not with any idea of changing their location but as shore birds do, tacking about in varied maneuvers to return as a unit to their original feeding ground. These erratic flights may even occur at their nesting grounds; their nesting is far more of a colony affair than is the case with the American Crow.

Lastly, the wing-beat is much faster. Several times I have mistaken a compact flock of Northwestern Crows for a flock of Band-tailed or domestic pigeons; this will give an idea of the speed they can put into their wing-beat. Of course this varies with the purpose of the birds; it is not especially fast when they are loafing.

Over and over again I have been struck by the similarity of their actions to those of the Old World Jackdaw. There is the same quick and united action, seemingly in response to the direction of a leader, coupled with a general playful tendency.

My acquaintance with the eastern Fish Crow is confined to their actions in the nesting season. I do not recollect any outstanding similarity; the eastern bird as I remember it seems to have a longer wing in proportion to its smaller size. I mention

this as one authority has made *caurinus* a subspecies of *ossifragus*. The rapid wing-beat of *caurinus* may be co-ordinated with a difference in the relative length of the wing bones. This is worth verifying.

The range of the Western Crow (*Corvus brachyrhynchos hesperis*), as given in the last A.O.U. Check-list (1931) is quite wrong. It does not start from "Central British Columbia" but from the southwestern portion of the Province. This form is of regular occurrence on Vancouver Island, although its nesting there has yet to be proved.

History repeats itself; in my fight for the recognition of the specific distinctness of *Corvus caurinus* I am reminded of a similar controversy far back in the last century between my father, the late W. E. Brooks and my paternal sponsor, the late Allan Hume in the pages of the latter's "Stray Feathers." The controversy concerned the separation of the Hill Crow, *Corvus intermedius*, from the Jungle Crow, *C. culminatus;* my father insisted that their voices were quite distinct but Hume would clinch his argument for their identity with the claim that as the skins could not talk the birds could not be separated. This is the difficulty with all crows of uniform coloration, but the classic corvine controversy, the specific separation of the Carrion and Hooded crows of the Old World, hinges not on a difference in voice, as their voices are the same, but on their very distinct coloration. It is now admitted by a number of persons that each is entitled to specific rank in spite of the fact that where their ranges overlap they interbreed freely and produce fertile offspring.

Okanagan Landing, British Columbia, March 6, 1942.

COCCIDIOSIS IN CALIFORNIA QUAIL

By CARLTON M. HERMAN, HARRY A. JANKIEWICZ, and ROY W. SAARNI

Coccidia are microscopic protozoan parasites which produce a disease known as coccidiosis. In birds they occur usually in the cells lining the intestine. The cysts of the resistant stage are discharged from the intestine in the fecal droppings and enter the same or other birds by contaminated food. They remain viable under ordinary field conditions for long periods and often resist influences which would kill most other parasites.

Different species of coccidia exhibit variations in the life cycle, but it is the same in essential details. The stage in which the parasites are eliminated from the intestine is called an oocyst. In the coccidian, *Eimeria,* the oocysts become divided internally into four sections, or sporoblasts. Two sickle-shaped, nucleated organisms, or sporozoites, are formed within each sporoblast. When an oocyst is ingested, the sporozoites break through the resistant membrane of the sporocyst, penetrate the mucous lining of the intestine, and continue with that part of the life cycle which takes place within the host.

By a process of multiple division, or schizogony, each sporozoite becomes a mother cell, dividing into many merozoites. These may enter other cells of the intestinal epithelium and repeat the process, or they may develop into male and female sexual bodies, or gametes. Fertilization takes place between male and female gametes, resulting in the formation of an oocyst. The oocysts leave the host in the fecal droppings and develop into the infective stage. This brief description of the life cycle illustrates the possibilities for the enormously rapid increase in numbers of these organisms when conditions are favorable.

Coccidiosis may be suspected from symptoms such as a general appearance of malaise, lack of appetite, and diarrhea, and it may be surmised at autopsy from a spotted or inflamed condition of the intestine. Positive diagnosis can be made by microscopic identification of oocysts in the feces, or of other stages in scrapings of the intestinal mucosa.

Adult quail frequently are infected with coccidia without apparent effect upon their well being, even though the percentage of infection is high. Such "carriers" are a constant source of infection to young birds, to whom an infection frequently may be fatal. In a number of fledglings autopsied concurrently with this study, coccidiosis was the cause of death. Coccidia have been reported from many other species of birds, but little is known of the incidence in most birds.

Publications dealing with the occurrence of coccidia in quail are limited both in number and scope. Tyzzer (1929) reported *Eimeria dispersa* in the Eastern Bob-white (*Colinus virginianus virginianus*). Venard (1933), in a study of 67 bob-whites of Ohio, found 32 birds, 47.8 per cent, infected with coccidia of three species. Stoddard (1931), in an extensive survey of quail in the southeastern states, found in North Carolina only 6 of 25 mature bob-whites infected, none having large numbers of oocysts. In South Carolina, 19 of 75 mature bob-whites showed infection, with numerous oocysts in only one specimen. Of 23 birds from Grand Junction, Tennessee, 7 were infected, most of them lightly. No oocysts were found in the intestinal tracts of 7 winter bob-whites from Alabama, although the number was considered too small to be conclusive. From the Biloxi district of Mississippi, 9 of 18 winter birds, shot in a wild, sparsely populated region, were infected, some with more oocysts than noted previously in wild bob-whites. Of 78 birds killed at all seasons during two years in

southwestern Georgia and northern Florida, 19 showed from a very few to many oocysts. From Beachton, Georgia, 8 of 14 mature birds were infected, although in only one case was it heavy. Cock bob-whites examined in spring and early summer showed from 25 to 50 per cent infection in fecal droppings. It was observed that coccidia became more prevalent in 1927, a year especially favorable for bob-whites in the districts studied.

Henry (1931) examined California Quail (*Lophortyx californica*) and Mountain Quail (*Oreortyx picta*) from game farms, together with a few wild birds, and identified two species of coccidia, with a questioned third. O'Roke (1928), in a fifteen months' survey of California Quail, found no coccidia in the visceral organs of birds examined, and considered them free from parasites of the digestive tract and in a healthy condition "at this time of the year." In a previous paper Herman and Jankiewicz (1942) reported upon the presence of at least three species of *Eimeria* in both wild and captive California Quail.

Coccidia of the genus *Isospora* have been reported from 32 species of birds from California by Henry (1932) and by Boughton (1938), who cited previously unpublished records of Henry.

The present paper reports coccidia in wild California Quail, and gives the percentages and intensity of infection. Data are based upon 121 birds procured from April to October, 1941, inclusive. Specific identification of four species of *Eimeria*, with a possible fifth, will be discussed in a later paper. Coccidia are reported also from several other species of birds.

This contribution is the joint effort of the San Joaquin Experimental Range, United States Forest Service, and the Los Angeles Wildlife Disease Research Station of the Fish and Wildlife Service as a part of the Cooperative Quail Study. Work Projects Administration Official Project No. 65-2-07-344 assisted in the study. The material for examination was collected at the San Joaquin Experimental Range, situated in the foothills of the Sierra Nevada near O'Neals, Madera County, California. Quail were trapped and held in individual cages until fecal droppings were obtained; the birds were then banded and released. Each fecal sample was placed in a small glass vial and covered with a two per cent solution of potassium bichromate to prevent growth of bacterial contaminents.

Each sample was centrifuged in a 15 milliliter tube filled with distilled water. The supernatant fluid was decanted and the tube was refilled with zinc sulphate solution (331 grams per liter of water), after Faust *et al.* (1939). The tube was again centrifuged, after which the flattened end of a glass rod was used to remove the top film to a slide for examination under the microscope. The intensity of infection was recorded according to the number of oocysts in the drop thus obtained: no oocysts, negative; 1-10, 1+; 11-50, 2+; 51-100, 3+; 101-500, 4+; 501-1000, 5+; 1001 and over, 6+.

TABLE I

Percentages of infection of California Quail

Age of quail	Under 4 weeks	4 months to one year			One year or over			Totals		
Sex	Undetermined	♂	♀	total	♂	♀	total	♂	♀	All birds
Number examined	8	27	22	57	37	27	64	64	49	121
Number infected	1	21	11	33	31	25	56	52	36	89
Percentages of infection	12.5	77.7	50.0	57.9	83.8	92.6	87.5	81.2	73.5	73.5

Occurrence of infection.—Adult female birds, as noted in table I, were 92.6 per cent infected over the period of the survey, with adult males 83.8 per cent infected. Since young birds remain in close proximity to the females, it is presumable that the possibility of their infection is thereby increased.

Intensity of infection.—A rise and fall in the intensity of infection was noted in five birds which were retrapped several times. Table II shows under each bird the various dates on which samples were taken and the findings for each sample.

TABLE II

Intensity of infection in five birds

No. 36439, ad. ♂		No. 36086, ad. ♂		No. 36493, im. ♂		No. 36331, ad. ♂		No. 36386, ad. ♂	
April 29	1+	June 13	4+	July 17	—	May 6	2+	May 5	—
May 28	1+	June 25	2+	Sept. 8	—	May 26	5+	June 10	2+
June 3	4+	July 14	5+	Sept. 25	—	June 9	2+	June 20	4+
June 5	1+	July 28	1+	Sept. 30	4+	June 12	3+	June 24	—
June 9	5+	Sept. 22	1+	Oct. 6	—			June 28	—
June 19	3+	Sept. 30	—	Oct. 13	3+				

The decrease of infection evidenced in the preceding figures probably is accounted for by the spontaneous elimination of most of the parasites within a week, while the increase in infection was due to reingestion of contaminated food, as noted by Herman and Jankiewicz (*op. cit.*) from laboratory observations.

From the 56 immature birds examined, the data are insufficient for statistical analysis. Stoddard (*op. cit.*) noted that "the severity of coccidia infection in growing quail is roughly in inverse proportion to their age." The data here presented do not confirm this statement. Seasonal or other factors may be involved in the intensity of infection.

TABLE III

Monthly incidence of coccidia

Month	Number examined	Number infected	Percentage of total infected
April	19	18	94.7
May	16	13	81.2
June	38	29	76.3
July	15	7	46.7
August	4	1	25.0
September	21	5	23.8
October	45	17	37.8

Reports by other authors have drawn no definite conclusions in regard to seasonal incidence of coccidian infection, but it is possible, judging from a comparison of these monthly findings, that a relationship does exist between the seasons and the intensity of infection, as suggested by Madsen (1941) in his study of helminths and coccidia in partridges and pheasants in Denmark. However, a more extensive sampling of birds over a period of several years would be necessary to substantiate this hypothesis.

Infection in other species of birds.—Thirty individual birds of species other than quail were examined in the course of this survey and coccidians of the genus *Isospora* were observed in 11 individuals, of 7 species, as follows:

	No. Exam.	No. Inf.
Killdeer (*Oxyechus vociferus*)	1	0
Mourning Dove (*Zenaidura macroura marginella*)	5	0
Red-shafted Flicker (*Colaptes cafer collaris*)	1	0
California Jay (*Aphelcoma californica immanis*)	9	1
Bewick Wren (*Thryomanes bewickii drymoecus*)	1	0
Green-tailed Towhee (*Oberholseria chlorura*)	1	1

Spotted Towhee (*Pipilo maculatus falcinellus*)	1	1
Brown Towhee (*Pipilo fuscus carolae*)	8	5
*Lark Sparrow (*Chondestes grammacus strigatus*)	1	1
*White-crowned Sparrow (*Zonotrichia leucophrys gambelii*)	1	1
*Golden-crowned Sparrow (*Zonotrichia coronata*)	1	1

*Infection previously reported by Dora P. Henry (Boughton, *op. cit.*).

SUMMARY

The presence of coccidian infection in California Quail at the San Joaquin Experimental Range, Madera County, California, has been reported from an examination of the fecal droppings of 121 birds over a period of four months. Infection was noted in 89 birds. Percentages of infection have been given for adult and immature quail and for males and females. A rise and fall in intensity of infection was observed in individual birds at different samplings. An analysis was made of monthly incidence of infection, with a decrease noted from April to August, suggesting a possibility of seasonal variation. A higher percentage of infection seems evident in female birds. Coccidian infection was noted in 11 individual birds other than quail, representing 7 species, from the same locality.

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Los Angeles, California, April 2, 1942.

HIGH POPULATION OF BREEDING BIRDS WITHIN AN ARTIFICIAL HABITAT

By FRANK A. PITELKA

The value of data on breeding bird populations within modified or "man-made" habitats is sometimes questioned in the face of our efforts to understand the problems of each species within its *natural* environment. Still, contributory evidence is forthcoming from surveys of such habitats. Aside from this, the high densities of birds which frequently occur under artificial conditions have evoked considerable comment, if only to the effect that birds are "attracted" to man!

During the period from May 20 to June 27, 1941, the writer studied an exceptional concentration of breeding birds within a well-delimited area occupied by the resort village of Dillon Beach, Marin County, California. This isolated village borders a sandy beach at the south end of Bodega Bay. To the north and east, it is surrounded by open grasslands of the coastal hills; to the south lie partially vegetated dunes. Certain distributional records from this region have already been reported (Condor, 1941, 43:294-295).

The breeding birds of terrestrial habitats outside of the village were strikingly few in number. On the open grassy hills, the only breeding species were Savannah Sparrow (*Passerculus sandwichensis*), Horned Lark (*Otocoris alpestris*), and Raven (*Corvus corax*). The Turkey Vulture (*Cathartes aura*) occurred regularly over the open country, but was not found breeding along the coast. Two frequent vagrants from the hinterlands were Red-tailed Hawk (*Buteo jamaicensis*) and Meadowlark (*Sturnella neglecta*). In the dunes, the breeding species about the shrubs and grassy areas were Savannah, White-crowned (*Zonotrichia leucophrys*) and Song (*Melospiza melodia*) sparrows. (A series of water bird species occurred along the beach, on the dune ponds, and on mud flats to the south; but except for single pairs each of the Marsh Hawk (*Circus hudsonius*) and Coot (*Fulica americana*), none of these bred.) In both individuals and species, numbers of breeding grassland and open-country birds increased noticeably inland. The village itself was something of an avifaunal oasis, and the otherwise limited numbers of birds on the coastal hills were increased by addition of several species which made frequent foraging excursions from their breeding sites within the village.

The area of the population study is a roughly rectangular plot of approximately seven and one-half acres. It is bounded by plantings of evergreen (largely cypress, some pine) and eucalyptus trees, which enclose the numerous small cottages of the village. To the east and north, a row of cedar trees borders the village; to the northwest, two rows of trees, eucalyptus flanked by cypresses and pines, are planted on a slope, parallel to the beach; and to the southwest and south, less dense plantings of the same trees complete the inclosure. A small water course, Andrew Creek, also marks the south border and separates the study area from the neighboring dunes. Scattered groves and individual trees of eucalyptus and other broad-leaved species occur within the village. Among the cottages are gardened areas, lawns, and roadways with patches and borders of various shrubs. Approximately two acres of the study area are covered by tall trees, and about four-fifths of these are conifers. (Original data with aerial photographs and maps are deposited in the Museum of Vertebrate Zoology.)

Clear delimitation of the study area was facilitated by the sharp habitat changes along the margins of the village. The area was surveyed comprehensively for nests and sites of established pairs on June 2, but daily observations were made to ascertain proggress of breeding activities and to note local movements and additions of species or

individuals. Toward the end of the period of observation, no evidence of new or second nesting was found, and the figures given below may be regarded as an accurate approximation of the maximum breeding population density for the season of 1941. The species and numbers of breeding individuals are as follows:

California Quail (*Lophortyx californica*), 1 pair (1 PY*).
Allen Hummingbird (*Selasphorus alleni*), 7 females (1FN, 1FY). A male was noted within the area only on May 21.
Black Phoebe (*Sayornis nigricans*), 1 pair (1PN).
Barn Swallow (*Hirundo erythrogaster*), 1 pair (1PN).
Robin (*Turdus migratorius*), 2 pairs (1PY).
Russet-backed Thrush (*Hylocichla ustulata*), 2 pairs.
Mexican Bluebird (*Sialia mexicana*), 4 pairs (4PNY).
Brewer Blackbird (*Euphagus cyanocephalus*), 20 pairs (1PN, 1PNY, and at least 6PY).
English Sparrow (*Passer domesticus*), 10 pairs (2PN, 2PY).
House Finch (*Carpodacus mexicanus*), 14 pairs (1PN, 1PY).
Pine Siskin (*Spinus pinus*), 10 pairs.
American Goldfinch (*Spinus tristis*), 12 pairs (1PN).
White-crowned Sparrow, 3 pairs (1PY).
Song Sparrow, 3 pairs (1PY).

*Numbers within parentheses are those of established pairs noted with nest or young or both. All young listed above were fledged before the end of the observation period.

The total numbers of pairs is ninety (counting the hummingbirds as mated pairs, also). In terms of the total area of 7.5 acres, this yields about 12 pairs of birds per acre. The number of individuals listed is 173 (=23 breeding birds per acre).

The survey was made with an effort to count established pairs only, although other birds were, of course, noted as well. The figures given above are therefore somewhat below the actual population density, since in the more common species (especially House Finch, Brewer Blackbird, and English Sparrow) there were a number of apparently unmated individuals either wandering or keeping to favored feeding areas and water sources. The south-facing bank of Andrew Creek was usually alive with House Finches, only a few pairs of which were apparently nesting in adjoining eucalyptus trees. On the basis of estimates, the total number of individuals may safely be increased by ten per cent to account for birds present on the area but not established. Approximately 25 individuals, then, were present per acre. Except for the quail and hummingbirds, these were all passerines, and approximately a third of the latter were fringillids.

The following transients were noted on the study area: Flicker (*Colaptes cafer*), June 24; Rough-winged Swallow (*Stelgidopteryx ruficollis*), May 20-June 4; Cliff Swallow (*Petrochelidon albifrons*), frequent and nesting inland; Bewick Wren (*Thryomanes bewickii*), June 17-19; Yellow Warbler (*Dendroica aestiva*), May 20-21; Spotted Towhee (*Pipilo maculatus*), June 2; Brown Towhee (*P. fuscus*), June 2; Purple Finch (*Carpodacus purpureus*), June 10.

Four of the more abundant species nested largely in evergreens or eucalyptus trees in rows along the north, west, and south sides of the village. Selection of either of these vegetation types as nesting sites was as follows: nine (and all) established pairs of siskins in conifers; eight pairs of American Goldfinches (66 per cent of all pairs) in conifers; seven pairs of House Finches in conifers, six in eucalyptus (93 per cent of all pairs); and twelve pairs of Brewer Blackbirds in conifers, eight in eucalyptus (constituting all pairs). Pairs not included in this listing were located in sites other than conifers or eucalyptus. (Inland, Brewer Blackbirds and House Finches were encountered frequently; the American Goldfinch, however, was uncommon, and the siskin was not found elsewhere in the region.)

There was evidence of grouping of the blackbird nests, but the immediate vicinity of the nest was defended by males and encounters were noted only among the males. However, neighboring pairs responded to alarm calls of any individual within their immediate group and would participate in driving off an intruder. Linsdale (Amer. Midl. Nat., 19, 1938:145, 152) recognized colonial nesting in this species, which, however, was monogamous in contrast to other colonial icterids (*Xanthocephalus* and *Agelaius*). During the first week of observation, pairs of Brewer Blackbirds were noted at various stages of the breeding cycle: certain individuals were in courtship and, on the other hand, a few pairs had young in the nest. On cool days during this earlier period, small flocks of seven or eight individuals were formed. Blackbirds foraged over the adjoining open country for distances occasionally as much as one mile (Stemple Creek). Outside of the village, they fed most frequently about the marshes in the dunes. Certain indidivuals with nests in evergreens along the north border, especially females actively feeding nestlings, were noted commuting over the village to and from dune ponds to the south. Toward the end of the observation period, pairs with young out of the nest wandered away from the village and frequented the borders of these ponds.

Other than occupation of independent nesting sites, there was no evidence of territoriality in either *Carpodacus* or *Spinus*, and these finches flocked generally during feeding. Mixed flocks, occasionally including all three species, were noted on the grasslands several times; in one such flock there were approximately fifty individuals. In neither the blackbirds nor the finches was it possible to determine with accuracy numbers of birds foraging outside of the study area, since such activity was quite irregular and in both groups considerable feeding took place within the village. The blackbirds, however, foraged away from the village with greater frequency and over longer distances than the finches.

Certain figures from other population surveys of man-modified habitats are available for comparison. Kendeigh *et al.* (Bird-Lore, 39, 1937:386; 40, 1938:350; and 41, 1939 (No. 4, supplement):30) records densities varying from 10.9 to 15.9 birds per acre on a country estate in Ohio during the period 1935-1939. Goodman (Bird-Lore, 42, 1940 (No. 4, supplement):491) reports 19.8 birds per acre on a Kansas farm. Cooke (U.S. D.A. Bull. 165, 1923:23) cites a count of 20.2 birds per acre over a 40-acre tract in Golden Gate Park, San Francisco. Lack (Ibis, 1937:372-373) summarizes a series of American and European censuses of "island" gardens. Natural sites may yield as many as 10-15 birds per acre—or even 22 (Bird-Lore, 40, 1938:350)—if considerable habitat "edge" is present.

Museum of Vertebrate Zoology, Berkeley, California, April 18, 1942.

BIRDS OF THE COAST OF CENTRAL BRITISH COLUMBIA

By HAMILTON M. LAING

In the years from 1932 to 1941, the writer has at times been engaged in biological exploration of the coastal strip of central British Columbia. The following bird notes are offered to indicate extensions of range for many species scantily mentioned in the A.O.U. Check-list of 1931. The region covered includes Vancouver Island from Comox northward to Cape Scott and the opposite mainland from Lang Bay, close by the entrance of Jervis Inlet, to Kimsquit at the head of the Dean Channel. The only considerable penetration inland was made up the Bella Coola Valley, to Stuie, forty miles from salt water, and northward from this point to the western edge of the Rainbow Mountains. In the region of the mainland coast especially, not so difficult of access as hard to investigate when the worker is located, observation must mainly be confined to the flats at the river-mouths of the inlet heads. Steep wooded and rocky mountain sides rising from the salt water are not conducive to extensive travel. Accordingly, these notes are not offered with any idea of completeness. Points worked in this investigation, in the seasons of 1935 to 1940, inclusive, were as follows: Upper Campbell Lake, Sayward, Shushartie and Cape Scott on Vancouver Island; Horseshoe Lake, ten miles inland from mouth of Jervis Inlet, Stuart Island, Bute Inlet, Loughborough Inlet, Kingcome Inlet, Rivers Inlet and near-by Owikeno Lake, Calvert Island, Hagensborg in the Bella Coola valley, and Stuie, forty miles inland on the Atnarko River, Caribou Mountain (south of Atnarko River), head of Mosher Creek (north of Atnarko River), Rainbow Mountains, and Kimsquit at mouth of Dean River, Dean Channel.

As a good part of these observations has been gleaned while engaged in field parties directed by the National Museum of Canada, these notes are published by the kind permission of that institution.

Gavia arctica pacifica. Pacific Loon. Summers fairly commonly, doubtless not breeding, along coastal waters, at least as far south as Stillwater, B.C. Observed to pay daily visits to inland lakes. At Sayward, Vancouver Island, in mid-August, 1935, it was seen daily flying up and down the valley of Salmon River, to and from inland waters. In June and July of 1936 its flight to Horseshoe Lake, about a dozen miles inland, north of Lang Bay (near entrance to Jervis Inlet) were a feature of that camp. Never more than two birds were observed together. Such flights, usually at evening or morning, were well advertised by a strange *Ark-rak-rak-rak*—a dry, vibrant call that could be heard afar. In early June, 1939, these loons were observed several times at Port John, King Island, and later, on July 9 of the same year, two, one a high-colored bird, began making daily visits to the bay at Kimsquit (Dean Channel). Although late July and August appearances might indicate a return of migrants, there is ample evidence to show that the species, in some numbers at least, summers on these waters, both salt and fresh.

Pelecanus erythrorhynchos. White Pelican. Within the last ten years White Pelicans have several times been reported on northward migration in the vicinity of Comox, Vancouver Island. A specimen of date June 15, 1931, in the writer's collection was donated by the local game warden who had seized the bird. This is probably the most westerly route followed by White Pelicans, presumably en route to the breeding colony reported in the Anahim Lake region some seventy miles inland from salt water at Bella Coola.

Querquedula cyanoptera. Cinnamon Teal. The arrival of a breeding pair at the Courtenay slough, midway north on Vancouver Island, on April 30, 1934, and their suspected nesting, kindled hopes of permanent summer residence. This has not come about, perhaps because of the smallness of the breeding area and heavy shooting in each open season. On May 13, 1941, another pair was observed on the same slough.

Aix sponsa. Wood Duck. Although long reported from the southern part of Vancouver Island, the most northerly Island record known to the writer is that of a young male taken unwittingly by a local hunter in the fall of 1938 near Merville. In 1936 on the opposite mainland, Wood Ducks were noted near Horseshoe Lake in mid-July; at Lizard Lake on July 16, three were seen.

Cathartes aura. Turkey Vulture. On August 25, 1936, two buzzards were seen working over the slashing at Grassy Bay, near Roy, Loughborough Inlet.

Buteo lagopus s. johannis. American Rough-legged Hawk. Apparently a rare migrant in the coastal strip. In eighteen years' residence at Comox, the writer has one record only, a juvenal female shot by Ethel M. Laing, October 7, 1940, at Comox.

Aquila chrysaëtos canadensis. Golden Eagle. Because of its rarity along the coastal strip, it is perhaps worth recording that on January 21, 1930, a Golden Eagle was seen by the writer near Comox and two days later a specimen shot at Oyster River was donated by Mr. Keith MacKenzie; it was judged to be a second-year bird.

Falco columbarius bendirei. Western Pigeon Hawk. As Comox lies close to the center of the range of the black form, *F. c. suckleyi*, two records of the paler race, *F. c. bendirei*, are noteworthy: immature male, May 6, 1938, and another, May 16, 1939.

Fig. 61. Mouth of Kingcome River, British Columbia; most northerly point of occurrence of Hutton Vireo.

Ereunetes mauri. Western Sandpiper. This common migrant along the coast showed earliness of southbound migration by appearing at the head of Rivers Inlet on June 28, 1937. Specimens taken were of adult birds with gonads quiescent.

Larus canus brachyrhynchus. Short-billed Gull. When information was given in 1936 of gulls nesting at the second Gordon Pasha Lake, some twelve miles inland from Jervis Inlet, it was received doubtfully. Probably however it was true, as at the head of River's Inlet on June 28, 1937, a pair of Short-billed Gulls was found nesting on a piling on the site of the old saw mill. The nesting failed because of destruction by ravens and crows. William Billington, one time hatchery employee on near-by Owikeno Lake, gave the information that these gulls formerly had nested on derelict stumps sticking up out of the lake. Again in 1939, on June 22, at the head of the Dean Channel, the writer found a Short-bill brooding on the top of a piling of the abandoned logging wharf near the mouth of the Kimsquit River.

Zenaidura macroura marginella. Western Mourning Dove. Although not known on Vancouver Island north of Comox, on the mainland it has been reported at points from Stillwater to Bella Coola. On September 9, 1936, one was noted on the Halliday farm at the head of Kingcome Inlet. From this date on, one or two were seen here until September 21. On October 9, 1940, at Stuie, 40 miles inland

from Bella Coola, a dove spent part of the day at the writer's cabin, joining with juncos and song sparrows in feeding on some scattered grain.

Bubo virginianus subarcticus. Arctic Horned Owl. It is of interest that in the heavy southern movement of horned owls of the brown and black races that visited Vancouver Island in the winters of 1936 and 1937, two pale birds of the race *subarcticus* were bagged, one on October 30, 1936, and the other on January 10, 1937. Both birds were thin, in contrast to the more numerous brown (*B. v. lagophonus*) and black (*B. v. saturatus*) owls, which were very fat.

Strix occidentalis caurina. Northern Spotted Owl. The writer's contacts with this owl in the coastal strip have been most unsatisfactory, although it is his firm conviction that the bird occurs up the mainland coast as far north as Bella Coola. A male of a nesting pair was taken by the writer at Huntingdon, British Columbia, May 31, 1927; this is close to the United States border. To date the species has not been observed on Vancouver Island. At Horseshoe Lake in the Stillwater region on the mainland, the weird calls of this owl were heard several times in July of 1936. In the same summer at Fawn Bluff, Bute Inlet, another called every evening from the mountain side above Kenzie Lake, but it could not be decoyed out of the jungles.

Asio wilsonianus. Long-eared Owl. Doubtless this species has invaded the Comox area since the removal of the heavy forests. There have been other appearances here, but a quite young male, taken August 26, 1933, in the writer's yard at Comox seems to confirm breeding.

Cryptoglaux acadica acadica. Saw-whet Owl. Although east-central Vancouver Island should be well within the breeding range of this species, only one breeding record has come to light. On August 4, 1933, a very young female was taken in my backyard at Comox. This bird had been mutilated about the head, but this had healed; one eye was gone and the mandibles were so malformed as to be useless. At Nusatsum, Bella Coola valley on July 8, 1938, a nesting tree, the discovery of H. Hammer, was inspected. A young male was taken here. This nesting location was about 19 miles inland.

Dryobates villosus sitkensis. Sitka Hairy Woodpecker. A juvenile was taken at Safety Cove, Calvert Island, on July 31, 1937; birds also were taken at Port John, King Island, June 11, 1939, and at Stuie, August 18, 1940. These seem worthy of note as showing southerly extensions of range.

Dryobates pubescens. Downy Woodpecker. The most notable thing about the Downy Woodpecker at the stations worked is their scarcity. *D. p. gairdneri* was common enough at Comox and as far north as Campbell River on Vancouver Island but it was not found farther up the island nor at any point on the opposite mainland coast. At the mouth of Kingcome River on September 16, 1936, an adult male of *D. p. leucurus*, probably a migrant, was taken, and in 1938 this race was found breeding not uncommonly in the Bella Coola valley from Hagensborg to Stuie. Identification of these latter breeding birds has been confirmed by Dr. L. B. Bishop.

Empidonax traillii brewsteri. Traill Flycatcher. The characteristic call of this bird is now a common sound in the slashings of the eastern slope of Vancouver Island, where it has been traced northward to Cape Scott. On the mainland coast it has been taken at most suitable stations worked as far north as Kimsquit at the mouth of the Dean River.

Progne subis subis. Purple Martin. In view of the scarcity of this bird in the west, it may be worth recording its first appearance at Comox, Vancouver Island. A lone female was seen on May 26 and 27 in 1937. Also on June 20, 1940, two and possibly three were observed to be very noisy about the old pilings at the saw mill near Courtenay. Like many other birds, they probably are following the settlements into the region.

Corvus brachyrhynchos hesperis. Western Crow. Since December 8, 1933, when the writer definitely established the Western Crow as a winter resident in the Comox area (Canadian Field Nat., 49, 1935:56), this bird has not failed to appear each winter in greater numbers, mixing freely with the common native coastal form (*caurinus*). The two have been found to have a meeting place northward about the heads of several inlets. This was noted particularly at Rivers Inlet, in July and August of 1937, at North Bentick Arm, in June and July of 1938, and in Dean Channel (Kimsquit) in July and August of 1939. Whether this meeting of the two forms constituted a complete breeding fusion or mere meeting, could not be learned except by the difficult collecting of nesting pairs. The certainty is that especially at Kimsquit the two forms intermingled freely on the same area in the breeding season.

Nucifraga columbiana. Clark Nutcracker. In "A Distributional List of the Birds of British Columbia," Brooks and Swarth (Pac. Coast Avif. No. 17, 1925:81) report the nutcracker as "A rare straggler on Vancouver Island"; this will now bear some revision. The noting of a single noisy nutcracker at high elevation in the Forbidden Plateau on the island, June 19, 1935, suggests possible breeding. In the autumn of that year there was a small migration to the Campbell River area. They were heard and seen by the writer on November 5 and about this time they attracted the attention

Fig. 62. Head of Rivers Inlet. Dotted line indicates course of three-day trip from salt water to alpine realm of Hepburn Rosy Finch.

of other deer hunters. The species is well known in the Bella Coola valley, and is common at Stuie and northward in the Rainbow Mountains. It was met at salt water at Kimsquit, in July, 1939.

Dumetella carolinensis. Catbird. Absent apparently from the mainland coast immediately north of the Fraser River and on Vancouver Island. It reaches the coast at Bella Coola, however. It is common at Stuie, on the Atnarko River 40 miles inland, but is less so at Hagensborg, 12 miles up the Bella Coola Valley. It probably reaches salt water at the mouth of the Bella Coola River.

Hylocichla. Thrushes. The taking of five races of *Hylocichla* within a few miles and on almost common breeding grounds at Stuie in the summers of 1938, 1939 and 1940 would seem noteworthy. *Hylocichla g. guttata* bred from near sea level at Hagensborg to 5200 feet at the head of Mosher Creek. *H. ustulata swainsoni* coming westward from the interior met *H. u. ustulata* coming up from the coast in the vicinity of Stuie. *H. minima aliciae* shared the breeding ground at Mosher Creek at high elevation with the above *H. guttata*. *H. fuscescens salicicola* was common in the deciduous woods along the Atnarko and Bella Coola rivers, descending the valley to Hagensborg. At Kimsquit in 1939, *H. f. salicicola* was taken at salt water near the mouth of the Dean River, where it was common.

Sialia currucoides. Mountain Bluebird. The most southerly breeding records known to the writer are as follows: On July 8, 1936, at Horseshoe Lake, in one of the wide slashings, a nesting pair was located. The male was collected by George Holland, assistant to the expedition. On Vancouver Island, about 12 miles inland in the wide slashings near the Oyster River, on May 15, 1939, a pair showed unmistakably that they had a nest, although time did not allow search for the site.

Corthylio calendula. Ruby-crowned Kinglet. Ruby-crowns on the breeding grounds of the Kimsquit and Bella Coola areas proved of interest. In July of 1939 at Kimsquit, kinglets were found breeding in the mixed woods of spruce, Douglas fir, birch, willow and poplar at salt water along the shore of the Dean River flat. Next year, in July, at 5200 feet, at the head of Mosher Creek in the Stuie region, Ruby-crowns were breeding commonly in the alpine fir clumps at timber line. Although plumage of the Kimsquit specimens was badly worn, the race suggested is *C. c. grinnelli*. The specimens from high elevations were paler and lacked the dark throat and breast of *grinnelli*; they are referable to *C. c. calendula*.

Bombycilla cedrorum. Cedar Waxwing. This waxwing has followed civilization up the coast. It has been observed at practically all stations worked from Cape Scott in 1935 to Kimsquit in 1939. At the latter station in July a small company of about a dozen stayed about the site of the old cannery, yet until August 5 they showed no signs of breaking up for breeding.

Vireo huttoni huttoni. Hutton Vireo. Taken on Vancouver Island by the writer as far north as San Josef. A breeding pair was collected on July 4, 1933, and another specimen on September 15, 1935,

at Cape Scott by Kenneth Racey. On the mainland a juvenal female was taken at the head of Kingcome Inlet on September 13, 1936; it probably was a migrant from a more northerly home.

Vireo olivaceus. Red-eyed Vireo. Though reported by Swarth from the southern end of Vancouver Island in 1912, the bird was not found at Comox until 1941. On June 25 a male that had sung for some days on the ranch of the writer was collected for record. There was no proof of nesting; but five days later another male was singing at the same site. It was a surprise then when on August 1, 1936, at Fawn Bluff near the mouth of Bute Inlet, the song of the Red-eye came strongly from the hillside. It probably was nesting here. This bird was collected on August 17 by C. J. Guiguet. Next day after moving camp to Grassy Bay, Loughborough Inlet, Red-eyes again were found at salt water. Although not found at the Kingcome Inlet camp between September 9 and 26, 1936, it was doubtless there earlier in the season. It was not found in 1937 at the head of Rivers Inlet but in 1938 it was encountered commonly in the Bella Coola valley at Hagensborg. It was next met at salt water at Kimsquit at the mouths of the Dean and Kimsquit rivers. The gap in the range of this bird along the southwesterly coast of the Province may be explained by the fact that apparently many birds of eastern origin do not reach the west coast from the south but come down the river valleys from the interior, that is from the east.

Vireo gilvus swainsoni. Western Warbling Vireo. The 1931 Check-list (p. 279) states that this vireo breeds southward from "southern British Columbia," but this statement is much too conservative.

Fig. 63. Sitka spruces on densely wooded banks of Whonnock River, head of Rivers Inlet. Redstart first noted here at salt water in 1937.

The bird is to be found up the entire easterly slope of Vancouver Island to Cape Scott in almost every suitable habitat: deciduous woods of alder, willow, etc. It occurs also in most of the similar places on the flats at the mouths of the mainland coastal rivers. It is even more common to the north, as in the Bella Coola valley and at Kimsquit.

Vermivora peregrina. Tennessee Warbler. It was rather a surprise in 1939 to find this warbler breeding at salt water on the Dean River flat at Kimsquit. A female and nestling were taken here on July 14. To prove that this was no isolated record, the male of another family was collected on July 18.

Dendroica nigrescens. Black-throated Gray Warbler. Records of this warbler for Vancouver Island would seem to be in doubt. To date no collector of the several who have worked in the Comox area has produced a specimen. Exploration on the mainland coast, however, has met with better success. Suspected at Horseshoe Lake in July, 1936, the Black-throated Gray was finally taken on Stuart Island at the mouth of Bute Inlet by C. J. Guiguet on July 24; the specimen is a juvenal female. Several were seen here. At Fawn Bluff on Bute Inlet it was met again by both Guiguet and the writer, but it was not encountered again until 1938 when in the Bella Coola valley it was found by no means rare from Stuie to Hagensborg; breeding specimens were taken. At Kimsquit in June and July of 1939 this elusive warbler, so confusing when on the same ground as the Townsend, was not secured, although it probably was seen once by the writer. In 1940 it was fairly common in the Atnarko valley at Stuie.

Dendroica striata. Black-poll Warbler. On July 16, 1940, at the headwaters of Mosher Creek, on the high alpine plateau at over 5000 feet, two singing males were encountered. One of these was collected for record. The other male continued to sing and was seen many times later, although nesting was not established. On August 1, however, while calling up birds a mile from the previous site, another male came in close, accompanied by a female. This summering ground lies north of the Atnarko River and about forty miles from salt water.

Seiurus noveboracensis. Water-thrush. A juvenal female taken on August 27, 1936, at Grassy Bay, Loughborough Inlet, was a surprise. In 1938, however, exploration of the Bella Coola valley showed the bird to be a not uncommon breeder at Stuie on the Atnarko River, 40 miles above salt water. Water-thrushes ranged downstream at least as far as the junction of the Talchako.

Icteria virens longicauda. Long-tailed Chat. Occasional appearances of the chat in the Comox area would indicate that the bird may become a regular summer resident. At midnight of May 26, 1934, as the writer walked home from Courtenay in the moonlight, a chat was waking the echoes from thickets along the Puntledge River. With the chat songs of the lower Columbia River valley but a day old in ear, there could be no mistaking that moonlight sonata. On June 15, 1940, at exactly the same place a chat was again heard in mighty song, this time at noon. Five days later, in the evening, he was still chanting jubilantly.

Setophaga ruticilla. American Redstart. Not known to date from Vaucouver Island, but the species appears northward on the mainland coast. It was first suspected at the head of Rivers Inlet on June 19, 1937, when a singing male was pursued and shot but lost. It next turned up as a com-

Fig. 64. View across Mackenzie Valley to western edge of Rainbow Mountains; photograph from an elevation of 6500 feet.

mon breeder in the Bella Coola valley in June of 1938, where it was taken at Hagensborg but found more numerous farther inland. At Kimsquit in 1939 it was one of the commonest summer birds in the mixed woods along the shore of the Dean flat at salt water.

Sturnella neglecta. Western Meadowlark. At camp at Cape Scott, from September 13 to 30, 1935, meadowlarks were several times seen by the members of the party. On September 26, R. E. Lusher noted three of the birds. These were migrants from unknown source. They were reported uncommon in autumn in Bella Coola valley. On October 12, 1939, a single bird was noted there by the writer on the Wright ranch and later this or another tried to winter there. On October 9, 1940, another lone straggler was noted at Stuie.

Molothrus ater. Cowbird. The most westerly record that could be expected of the Cowbird was made at Safety Cove, Calvert Island, on August 10, 1937, when a young one scarcely of independent age was shot. A Yellow Warbler was suspected of being foster parent.

Hedymeles melanocephalus melanocephalus. Black-headed Grosbeak. Long known to breeding on Vancouver Island as far north at least as Lower Quinsam Lake, this species has more recently been traced up the mainland coast as follows: breeding at Horseshoe Lake, June 24, 1936, and at Fawn Bluff, Bute Inlet, August 1, 1936. Later in 1938 it was found to be a common summer resident of the Bella Coola valley at least as far down as Hagensborg and probably reaching the river mouth.

Passerina amoena. Lazuli Bunting. There is an early record by Wm. Spreadborough of a female taken June 23, 1893, at Comox. The writer has never in seventeen years found it here nor at any mainland coastal station in the dozen worked. Thus the taking of a juvenal male on September 9, 1935, by R. E. Lusher, at Shushartie, northern Vancouver Island, must be regarded as unusual.

Carpodacus purpureus. Purple Finch. Specimens of *Carpodacus* from the Bella Coola valley, July 8, 1938, and Kimsquit, June 29, July 7, and July 13, 1939, at which latter site the species bred commonly, are noteworthy in that they may be regarded as an extension of range westward for the eastern race rather than northward for *C. p. californicus*. Major Allan Brooks, who has studied these specimens critically, has found them intermediate between the two races, the color favoring *californicus*, the wing formula *C. p. purpureus*.

Carpodacus cassinii. Cassin Purple Finch. The taking of specimens from a family of young of this species at Mosher Creek, near Stuie, 5200 feet, July 31, 1940, would seem to be a considerable extension of range northwestward.

Pinicola enucleator. Pine Grosbeak. In the region under consideration this is an uncommon bird. At Comox a small flock of a dozen was observed at Black Creek on January 14, 1941. In summer it was found by the author only on King and Calvert Islands and at the head of Rivers Inlet, where doubtless it was breeding. At the latter site, 3 specimens were taken on July 2 and 3, 1937, but as no high-plumaged males were obtained, the material is unsatisfactory for racial identification. The specimens measure small and suggest *P. e. carlottae*.

Spinus tristis salicamans. Willow Goldfinch. "Extreme southwestern B. C.," the northern limit set by the Check-list must be modified, as this goldfinch has long been common in the Comox region and northward on Vancouver Island. It has been reported also from Powell River on the opposite mainland. Of stations worked on the mainland, it was met only at Stuart Island at the mouth of Bute Inlet, but apparently it is known to some residents of the Bella Coola valley.

Comox, British Columbia, January 31, 1942.

FROM FIELD AND STUDY

Fig. 65. Nest of Say Phoebe (*Sayornis saya*) showing rocks used in construction.

Use of Rocks in Say Phoebe's Nest.—On April 12, 1942, a nest of the Say Phoebe was found on a rocky cliff in a canyon of the Virginia Range east of Reno, Nevada. The nest was situated on a narrow horizontal shelf which sloped downward. Perhaps to prevent slipping on this shelf, the whole outer base of the nest was formed of small angular rocks (weathered veined quartz), averaging about an inch in length and 2½ to 3 grams in weight. The upper and inner parts of the nest were being finished at this time, chiefly with wool apparently gathered from bushes where tufts of it had been caught from sheep passing through the area. When the accompanying photograph (fig. 65) was taken on May 10, the nest was finished and contained eggs.—FRANK RICHARDSON, *University of Nevada, Reno, Nevada, May 17, 1942.*

Pacific Eider Nesting at Glacier Bay, Alaska.—On June 30, 1941, while on an archaeological reconnaissance trip to Alaska for the University of New Mexico, my husband, Dr. Frank C. Hibben, and I landed on North Marble Island at the entrance to Muir Inlet in Glacier Bay. This rocky island is the nesting place for many sea birds, and we landed to take colored moving pictures. Nesting there were both kinds of puffins, Glaucous-winged Gulls, and Pigeon Guillemots. Twice we noticed three male Pacific Eider Ducks (*Somateria mollissima v-nigra*) fly past, and took one short shot of them as they flew, feeling that this might be an unusual place to find them. Later we flushed a female eider duck from her nest, photographed her as she walked to the edge of the water and slipped in, swimming near us, and not attempting to fly. Lifting up the branches of the alder from under which she had appeared, we found a nest and six eggs, one egg still wet as if it had just been laid. We took pictures of this also, being careful not to touch the nest or egg.

The A.O.U. Check-list for 1931 (p. 56) states that the Pacific Eider breeds south and east to Cook Inlet. However, Bailey (Auk, 44, 1928:189) reports this species at Glacier Bay in summer. Heretofore there has been no actual breeding record from this region.—MRS. FRANK C. HIBBEN, *Albuquerque, New Mexico, February 14, 1942.*

The European Starling in New Mexico.—Although the European Starling (*Sturnus vulgaris*) has been reported on two previous occasions in the Rio Grande Valley of New Mexico (Condor, 42, 1940:86; *ibid.*, 43, 1941:197), the bird has occurred only sparingly and in small numbers.

As evidence that it is moving west in larger numbers, it may be reported that a flock of about 100 birds was noted at Elida, Roosevelt County, New Mexico, on February 25, 1942. Individuals and groups of from 3 to 10 were noted at Roswell and Portales in this same week.

This exotic pest species has become a disturbing problem in the northeastern United States, and it appears that it will soon be a problem of considerable concern to agriculturists and city dwellers in much of the west.—CLARENCE COTTAM, CLARENCE A. SOOTER, and RICHARD E. GRIFFITH, *Fish and Wildlife Service, Washington, D.C., May 12, 1942.*

Duck Hawk Takes Short-eared Owl.—While driving along one of the patrol roads in Unit 9 of the Malheur National Wildlife Refuge, Oregon, at 4:30 p.m. on December 6, 1941, a Duck Hawk (*Falco peregrinus*) was flushed from the side of the road. Examination of the place from where the bird flushed revealed the carcass of a freshly killed Short-eared Owl (*Asio flammeus*). The owl had apparently been struck in the back of the head by the hawk. At the time the owl was found, the greater portion of its head had already been eaten and the breast was fairly well picked.

When flushed from its unusual meal, the hawk flew about 100 yards away and lit where three Marsh Hawks found it and chased it to a fence post about 100 yards from the writer.—CLARENCE A. SOOTER, *Fish and Wildlife Service, Burns, Oregon, December 6, 1941.*

Food of the Burrowing Owl in Western Nevada.—On June 8, 1939, A. C. Hawbecker and I picked up approximately a dozen pellets (some broken material) around an occupied Burrowing Owl (*Speotyto cunicularia*) nest, about three miles northeast of Yerington, Nevada. These were subsequently analyzed by Mr. Charles Miller, with a small amount of help from me.

The following items of prey were found, each named as completely as the identifications were carried:

Mammalia	
Thomomys	1
Reithrodontomys megalotis	3
Peromyscus maniculatus	4
Sylvilagus (very young)	1
Reptilia	
Pituophis (young)	1
Amphibia	
Scaphiopus	30
Arachnida	
Scorpion	1
Insecta	
Odonata	
Agrionidae (?)	1
Orthoptera	
Locustidae	1
Heteroptera	
Pentatomidae	1
Coleoptera	
Unidentified	3
Carabidae	2
Silphidae	11
Elateridae	16
Buprestidae	1
Tenebrionidae	7
Lucanidae	1
Curculionidae	2
Hymenoptera	
Formicidae (?)	8

Of the seven whole pellets, four contained spadefoot toad remains. No remains of birds were found. It thus appears that these owls had appetites like those reported by Sperry (Wilson Bull., 53, 1941:45) rather than those observed by Neff (Condor, 43, 1941:197-198).—R. M. Bond, *Piedmont, California, February 11, 1942.*

Water Birds Influenced by Irrigation Projects in the Lower Colorado River Valley.—Perhaps few regions in the United States offer greater inducements to the ornithologist than does the lower Colorado River Valley near Yuma, Arizona. Because of various water developments in the past and the continued expansion of such operations, the original arid desert constantly is being converted into productive farm land. To effect this change have come the necessary lakes, canals, sloughs and drainage ditches of which the Laguna Diversion Dam and Imperial Canal, the Imperial Diversion Dam and All-American Canal, and the proposed opening of the several-thousand-acre Gila Project are outstanding examples.

Because of the lack of continued bird study in the Yuma area in the past, the effect that these changes may have had on the ornithology of the region is difficult to ascertain, but it is felt that it has been considerable. Although there probably has been a decrease in populations of certain species, the presence of abundant water in so arid a region has undoubtedly caused increases in those dependent on this factor.

During the winter and spring of 1940-41, the writer had occasion to make a series of visits to most of the areas near Yuma which have been influenced by this development. Although no specimens were collected, recent records are so few that it is felt notation should be made concerning significant observations of positively identified species. Special thanks are due to Mr. Allan R. Phillips for his aid in furnishing information on the status of various species.

Gavia arctica. Pacific Loon. On April 19, 1941, an adult was observed at close range on Mittry Lake (Laguna Dam), Yuma County, Arizona. This is apparently the first record for this species in this state.

Podilymbus podiceps. Pied-billed Grebe. Winter records were obtained on December 1, 1940, December 22, 1940, and February 9, 1941. On April 6, 1941, an adult with two very small young was seen on a small lake approximately three miles northwest of Somerton, Arizona, and on May 11, several two-thirds grown young were seen on Mittry Lake.

Egretta thula. Snowy Egret. Several seen on December 1, 1940, three recorded on December 22, 1940, and eight observed February 8, 1941, show this bird to be a not uncommon winter resident although previous published records for the area have not been found.

Ixobrychus exilis. Least Bittern. Two were seen at Lake Haughtelin, a small lake approximately three miles south of Bard, Imperial County, California, on October 5, 1940. There is a specimen in the Museum of Vertebrate Zoology taken 2½ miles northeast of Fort Yuma, California, on December 29, 1940. One was observed on the small lake northwest of Somerton on April 6, 1941, and still

another was recorded from approximately three miles east of Yuma on May 11, 1941. The actions of those observed in April and May would lead one to suspect that they are breeding locally.

Mycteria americana. Wood Ibis. A flock of 91 was seen in a field being flooded by irrigation water approximately two miles southwest of Somerton, Yuma County, Arizona, on September 22, 1940. This species is evidently a common but irregular summer visitant.

Dendrocygna bicolor. Fulvous Tree Duck. One was seen on October 5, 1940, at Lake Haughtelin near Bard, California.

Erismatura jamaicensis. Ruddy Duck. That the Ruddy Duck is present throughout the winter months is shown by the fact that 21 were seen on December 22, 1940, 10 on January 9, 1941, and one on February 9, 1941. On April 19, 1941, an adult female with two very young ducklings was seen on Mittry Lake, Arizona. A pair of this species with eight, one-fourth grown young was observed on this same lake on May 11, 1941.

Mergus merganser. American Merganser. On December 22, 1940, nine were observed along the river and on Mittry Lake by Dr. C. T. Vorhies and the writer. On May 11, 1941, a single male was seen on Mittry Lake. According to local sportsmen this species may be on the increase in this area.

Gallinula chloropus. Florida Gallinule. One was seen among the tules bordering Mittry Lake on December 22, 1940. A pair with seven very small young was watched for some time on the same lake, May 11, 1941. Local residents claim that it has also been known to breed at Lake Haughtelin, on the California side of the river. It is evidently resident in the lower Colorado River Valley.

Fulica americana. Coot. An abundant resident in the lower Colorado River Valley. On April 6, 1941, an adult with one, one-quarter grown young was observed on the small lake northwest of Somerton. On May 11, 1941, five adults with young varying in size from very small to almost half grown were seen on Mittry Lake.

Squatarola squatarola. Black-bellied Plover. Two individuals of this species were observed near Somerton on December 30, 1940.

Phaeopus hudsonicus. Hudsonian Curlew. On January 12, 1940, a flock of nine was positively identified approximately two miles south of Somerton. Although this appears to be the first record for this species in Arizona, it is understood that they are of quite common winter occurrence in Imperial Valley, California.

Totanus melanoleucus. Greater Yellow-legs. A not uncommon winter resident of the Yuma district. Two were observed September 28, twelve on December 22, and six on December 30, 1940, while eight were seen on January 12, 1941.

Actitis macularia. Spotted Sandpiper. This is a species of very common winter occurrence. Usually travelling singly or in pairs, it frequents the irrigation canals and margins of the lakes and sloughs on both sides of the river.

On October 1, 1940, the first *continuous* stream of water was allowed to flow into the All-American Canal which carries Colorado River water to Imperial Valley, California. It was with much interest that this newly formed large body of water was watched for signs of responsive bird life. During the first four months following its opening Lesser Scaup Ducks (*Nyroca affinis*), Redheads (*Nyroca americana*), Pied-billed Grebes (*Podilymbus podiceps*), Double-crested Cormorants (*Phalacrocorax auritus*), Spotted Sandpipers (*Actitis macularia*), Least Sandpipers (*Pisobia minutilla*), Killdeers (*Oxyechus vociferus*), and Belted Kingfishers (*Megaceryle alcyon*) were observed on or along the edges of the canal.—Lee W. Arnold, *Yuma, Arizona, April 15, 1942*.

Range Extensions of Three Lower California Birds.—Across the Gulf of California at its narrowest point lie three islands which form a broken bridge between the mainlands of Lower California and Sonora. These are, from west to east, San Lorenzo, San Esteban, and Tiburón. The first and last are, as might be assumed, closely connected faunally with their respective mainlands. San Esteban lies almost in the center of the Gulf, although closer to Tiburón than to San Lorenzo, and its avifauna seems to have been derived from several sources. Lower California, although more distant in a geographical sense, seems to have contributed the greater proportion, for at this writing only one species, *Toxostoma curvirostre*, can be definitely stated to have been of Sonoran origin. On the other hand, Lower California has contributed at least three races and one of these is not that of the nearest peninsular point but from some distance farther south. The three races in question are *Dryobates scalaris lucasanus*, *Myiarchus cinerascens pertinax*, and *Auriparus flaviceps flaviceps*.

Re-investigation of the subspecific status of certain resident birds of San Esteban Island was initiated when a recent study of the distribution of the Sonoran races of the Ladder-backed Woodpecker showed *lucasanus* to be the resident race there. (Incidentally, the race on the peninsula opposite San Esteban is not *lucasanus*, but *eremicus*.) From certain other data at hand it would seem none

too certain that this colony is of fortuitous origin. The flycatcher is too generally distributed to allow of any inferences, but the verdin is seemingly identical with that of the nearest part of the peninsula and the intermediate San Lorenzo Island. It may be here noted that the abundant material in the Dickey Collection and in the Natural History Museum at San Diego fully endorses the contention of Huey (Trans. San Diego Soc. Nat. Hist., 6, 1930:211) that there is a readily distinguishable race of the verdin in central Lower California and that *lamprocephalus* is confined to the Cape region proper.—A. J. VAN ROSSEM, *Dickey Collections, University of California at Los Angeles, May 1, 1942.*

Slate-colored Junco in Nevada.—Recently while studying a collection of birds from the West, a specimen of Slate-colored Junco (*Junco h. hyemalis*) was noted. This junco had been taken by Luther J. Goldman of the U. S. Bureau of Biological Survey at an elevation of approximately 8500 feet, near the summit of Silver Peak Mountains in Esmeralda County, southern Nevada, on October 6, 1915. The specimen, a female, is no. 260121 in the National Museum catalog. Insofar as we have been able to ascertain, this is the first record of the subspecies in Nevada.—CLARENCE COTTAM, *Fish and Wildlife Service, Washington, D.C., April 28, 1942.*

Another Woodpecker Bill Once Having Commercial Value.—In his well-known work (Reise in das innere Nord-America, 2, 1841:16), Maximilian, Prince of Wied, informs us that among the Mandan Indians some of the decorations for pipes were not locally available, "for example the upper beak and the red crown of a certain wood pecker (*Picus pileatus* Linn.), a bird that does not occur so far up the Missouri. For such a woodpecker head, which was brought from St. Louis, they gave a beautiful large bison robe, worth $6 to $8." For previous notes on this subject see the Condor for 1939, p. 164, and for 1942, p. 41.—W. L. MCATEE, *Fish and Wildlife Service, Washington, D.C., March 28, 1942.*

Differentiation of the Oven-birds of the Rocky Mountain Region.—Anyone who inspects a series of skins of the Oven-bird (*Seiurus aurocapillus*) may readily note an ample range of variation in the tone of green of the back, rump and tail. Occasional individuals are dull, gray-green. That there is a high degree of geographic segregation westwardly of the extremely dull-colored individuals has come to my attention through study of oven-birds from the east slope of the Rocky Mountains. This region constitutes the extreme western segment of the range of the species in the United States. A trend toward less intense green in birds inhabiting arid sections of the west is familiar in several species that possess similar dorsal coloration, as for example the Solitary Vireos, the Ruby-crowned Kinglets, and the Nashville Warblers. The differentiation in the oven-birds probably has not come to notice heretofore because they are not frequently collected in the Rocky Mountain region and because in spring and fall there may be an intermingling of bright green migrants that presumably breed in Alberta or Saskatchewan.

The differentiation of the western oven-birds is not complete. As with many races of birds occurring in continental North America, one may expect an occasional individual in one race population to possess many or all the characters typical of an adjoining race. The genes for these racial characters are it seems ubiquitous, but certain ones are rare indeed in some populations, while abundant if not universally present in others. I would not advocate nomenclatural distinction of a partial differentiate were not the magnitude of its color characters great and the segregation of individuals of the two races thus conceived possible to the extent of about 90 per cent. This constitutes a taxonomically practical situation on a par with, or even above par for, a number of long-recognized races of birds. It is suggested that the race of the Rocky Mountain region be known as

Seiurus aurocapillus cinereus new subspecies. Gray Oven-bird.

Type.—Breeding male, no. 79836 Mus. Vert. Zool.; 4 miles west of Fort Howe Ranger Station, 4000 feet, Powder River County, Montana, June 13, 1940; collected by Ward C. Russell, orig. no. 7317.

Diagnosis.—Compared with *Seiurus aurocapillus aurocapillus* of the eastern United States and Mississippi Valley, back, rump and lateral webs of rectrices grayer and paler, less intense olive-green, the feather tips at least approaching grayish olive; green almost lacking in the tails of some individuals; auriculars and side of neck less tawny. Although examples of a proposed form (*S. a. furvior*) from Newfoundland have not been examined, the coloration specified in the description (Batchelder, Proc. New Engl. Zool. Club, 6, 1918:81) is the antithesis of that of *cinereus*.

Geographic distribution.—Breeds along the lower eastern slopes of the Rocky Mountains and adjacent plains from the Yellowstone River in Montana south to the Arkansas River in Colorado

Suitable habitats include streamside woodlands and yellow pine forest. Is known as a migrant from Sinaloa and the Tres Marias Islands, Mexico, where it possibly winters.

Measurements.—Eighty *S. a. aurocapillus* from the Mississippi Valley and the eastern United States were measured and compared with the 11 adults and fall immatures of *cinereus* that were available. No significant differences is size were found. The sample of *cinereus* lacks long-billed variants such as are present in the eastern populations; tarsal length and, accordingly, bill length average less than in *S. a. aurocapillus*, but the minima for *cinereus* are no less than those for *S. a. aurocapillus*. Measurements of the type of *cinereus* are: wing, 72.5 mm.; tail, 51.9; bill from nostril, 8.4; tarsus, 20.7.

Comment.—In comparing dorsal coloration it was found that 6 of 64 migrant and spring residents from the East could not be distinguished from the least gray individual of *cinereus*. Only 1 of 28 eastern birds in fresh plumage approached the dull green of two fresh-plumaged *cinereus*. I would not interpret these few gray birds from the East as strays of *cinereus* but as variants of the eastern population.

Localities and dates for specimens of *cinereus* examined in addition to the type: Montana State College, Hedges Coll.: Miles City, Custer County, Montana, May 23, 1902, May 31, 1902. Mus. Vert. Zool.: 79834, 79835, type locality, June 12, 1940. Colo. Mus. Nat. Hist.: 12191, City Park, Denver, Colorado, July 30, 1930; no. 12289, Mt. Morrison, Jefferson County, Colorado, May 24, 1931; no. 22619, same locality, August 28, 1941; no. 21245, Castle Rock, Douglas County, Colorado, small juvenile, June 29, 1940; no. 2903, Holly, Prowers County, Colorado, May 19, 1913. Mus. Vert. Zool. 74815, 21 miles northeast of Rosario, Sinaloa, Mexico, May 1, 1932. Calif. Acad. Sci. 27763, Maria Madre Island, Mexico, May 16, 1925.

An additional bird from Holly, Colorado (C. M. N. H. 2904, ♀), taken May 14, 1913, does not agree with *cinereus* in coloration. It may be a migrant of *S. a. aurocapillus*, or this locality, far east in Colorado, may be an area of intergradation in which some bright green birds occur. A bird (M. V. Z. 75868) taken June 18 at Edmonton, Alberta, seems to indicate breeding of *S. a. aurocapillus* west to that point in Canada. Two stray migrants taken in California (C. A. S. 18078, Farallon Island, May 29, 1911; M. V. Z. 40648, near Lavic, San Bernardino County, May 18, 1920) are *S. a. aurocapillus*.

For essential aid in assembling material for this study I am indebted to the following persons: Alfred M. Bailey of the Colorado Museum of Natural History, James Moffitt of the California Academy of Sciences, and Philip L. Wright of Montana State University at Missoula.—ALDEN H. MILLER, *Museum of Vertebrate Zoology, Berkeley, California, June 14, 1942.*

NOTES AND NEWS

The following resolution sent to us should strike a responsive note among Cooper Club members.

"In times of stress, such as the present, there is danger that public resources of permanent value may be exploited unduly to furnish food and other materials.

"Be it resolved, therefore, that the American Society of Mammalogists at its 24th annual meeting, April 3, 1942, goes on record as opposing the use of any such materials from National Parks, National Monuments, or National and State Wildlife Refuges, unless it be demonstrated that such materials cannot be obtained elsewhere."

Mr. A. C. Bent writes us as follows: Now that fourteen of my Bulletins on the Life Histories of North American Birds have been published, your readers may be interested to know what progress is being made on future volumes. The fifteenth, on the Corvidae and Paridae, has long since been completed and is in the hands of the publishers in Washington. My work on the sixteenth, containing all the birds on the 1931 Check-list, from the nuthatches to the thrashers inclusive, is now practically done, except a few minor details.

I am now starting work on the seventeenth volume, in which it is planned to include all the birds on the 1931 Check-list from the thrushes to the vireos, inclusive. It is planned to accumulate manuscript in advance of publication, which may be retarded under the present war conditions.

I wish to take this opportunity to thank all those who have contributed material for previous volumes, to remind them that this is a cooperative work, and to ask them to send me contributions of notes, data and photographs relating to birds to be included in the seventeenth volume; the sooner these are received, the easier it will be for me to use them.

Important among publications recently received is Part 1, Number 1 of the Catalogue of Birds of the Americas. This volume, written by Charles E. Hellmayr and Boardman Conover, is more than ordinarily useful as it covers such groups as the Galliformes and Tinamiformes which have not been fully treated heretofore in the synoptic literature relating to the New World. —A. H. M.

Joe T. Marshall, Jr., and John Davis, ornithologists of the University of California's expedition to El Salvador, returned from Central America in late May. Their excellent collection of skins and skeletons, representative of a large proportion of the species of birds that occur in that country, arrived safely at the Museum of Vertebrate Zoology.

MINUTES OF COOPER CLUB MEETINGS

COVERNORS' MEETING

The twentieth annual meeting of the Board of Governors of the Cooper Ornithological Club was held at the University Club, San Diego, California, on April 3, 1942. Vice-president Emlen called the meeting to order at 8 p.m., with the following members present: Clinton G. Abbott, J. S. Appleton, Louis B. Bishop, R. M. Bond, W. Lee Chambers, Joseph S. Dixon, John T. Emlen, Jr., Eric C. Kinsey, Alden H. Miller, I. D. Nokes, Wilfred H. Osgood, Harry R. Painton, Howard Robertson, Jack C. von Bloeker, Jr., George Willett, Sherwin F. Wood.

Proxies were presented as follows: Amelia S. Allen, Harold C. Bryant, H. W. Carriger, Frances Carter, Hilda W. Grinnell, J. M. Linsdale, Herbert N. McCoy, Harold Michener, J. R. Pemberton, Gayle B. Pickwell, E. Lowell Sumner, Jr., John G. Tyler, and Curtis Wright, held by Alden H. Miller; Hildegarde Howard, Robert T. Moore, and Sidney B. Peyton, by George Willett; Frank N. Bassett and John McB. Robertson, by W. Lee Chambers; Tracy I. Storer, by Clinton G. Abbott; Luther Little by Howard Robertson.

Minutes of the nineteenth annual meeting were read and approved. The report of the Business Managers for 1941 was presented by W. Lee Chambers, which report is appended to these minutes. On motion by Joseph Dixon, the report was accepted. Sherwin Wood, chairman of the auditing committee, which consisted additionally of H. N. McCoy and H. W. Carriger, stated that the report of the Business Managers was in good order and that the Club's securities had been checked by his committee. Report of the auditing committee was accepted on motion by Howard Robertson.

Alden H. Miller presented a report for the editors of the Condor. This was received and approved by the Board on motion by Clinton G. Abbott.

Howard Robertson brought to notice the recent death of C. Hart Merriam, honorary member of the club. A committee consisting of Wilfred H. Osgood, Joseph Dixon and Clinton G. Abbott was named by the Chair to prepare a suitable memorial resolution. The resolution follows:

The Cooper Ornithological Club, through its Board of Governors, wishes to record its deep sense of loss in the death of Dr. Clinton Hart Merriam.

Through a lifetime of activity in the field of natural science, Dr. Merriam, both directly and indirectly, had a profound influence on the progress and knowledge of the zoology, botany and anthropology of the North American continent. Beginning in 1872 as naturalist of the Hayden Survey and continuing as chief and founder of the U. S. Biological Survey from 1885 to 1907, his work was mainly in the western United States and particularly in the state of California. Following the Death Valley Expedition in 1891, he traversed every part of the state and directed the work of many others in the same field.

His methods and discoveries marked an era in zoological exploration for which the generation following him is deeply indebted. No one appreciates this more than Californians, especially those of the Cooper Ornithological Club of which he was an Honorary Member since 1909.

As one of the most distinguished American zoologists, he received many honors and held many positions of distinction and trust. His love for California led him eventually to make his home there and during his later years he devoted much time to study of the fast disappearing native tribes of the state. The full import of his varied attainments exceeds the possibilities of a brief tribute, but an expression of the very great regard in which he was held in the field of his greatest activity can scarcely be made except in the highest terms.

It is ordered that this be spread upon the minutes of the Club and that it be transmitted to the surviving members of his family.

On motion by Alden H. Miller, a vote of thanks was extended to the local committee on arrangements, the Zoological Society of San Diego, and the San Diego Convention Bureau for the part each had contributed to the success of the annual meeting of the Club.

It was voted on motion of Clinton G. Abbott that a letter be sent to John McB. Robertson expressing the appreciation of the board of his excellent work as Treasurer.

It was agreed that the next annual meeting of the club would be held in northern California, the date to be set later. Approval of this ar-

rangement was made on motion by Howard Robertson.

The following officers of the Board were elected: Harry R. Painton, President; John T. Emlen, Jr., Vice-president; Alden H. Miller, Secretary.

Informal discussion ensued on the problem of storage of the club library and stock of publications.

Adjourned.—ALDEN H. MILLER, *Secretary.*

NORTHERN DIVISION

MARCH.—The regular monthly meeting of the Northern Division of the Cooper Ornithological Club was held on Thursday, March 26, 1942, at 8:00 p.m., in Room 212 Wheeler Hall, University of California, Berkeley, with President E. Lowell Sumner, Jr. in the chair and about 35 members and guests present. Minutes of the Northern Division for February were read and approved. There were two proposals for membership: Harriet Emlen Scott (Mrs. C. E.), 978 Cragmont Avenue, Berkeley, by Amelia S. Allen; Viola Memmler, 1448 Josephine Street, Berkeley, by Susan E. Chattin. Announcement was made of the Sixteenth Annual Meeting of the Club, to be held in San Diego April 3 to 5.

Field reports were numerous. Mr. Alden Miller had heard the first Warbling Vireo of the season on the campus the morning of March 26. Mrs. Allen said that a Townsend Solitaire had been present for two weeks on the hill at the mouth of Strawberry Canyon, on Mosswood Road. The week-end of March 21, she had seen 12 pairs of Green-winged Teal on the ponds at Alvarado. From east Oakland, Milton Seibert reported a Rufous Hummingbird March 6, Violet-green Swallows the 15th, and the finding of a Sparrow Hawk's nest with 2 eggs on the 17th. B. C. Cain had noted 3 Rough-winged Swallows on March 15 at Mountain View Cemetery. Lewis Woodpeckers have been unusually abundant this year in the vicinity of Mountain Boulevard, the Municipal Golf Course, and San Leandro. They have also been reported from Tilden Park and Orinda. Mrs. Kelly could report the usual early family of Bush-tits from Alameda, this year on March 23. Mr. Sumner had seen 15 Band-tailed Pigeons at Pinnacles National Monument and Milton Seibert had seen a flock in Santa Clara County at Gilroy Hot Springs.

To introduce the subject of the evening, "A Life History Study of the White-tailed Kite," by A. C. Hawbecker, Mrs. Dorothy Dean Sheldon exhibited the original painting by Roger Tory Peterson, made for the poster used in the campaign for conservation of the Kite. Mr. Hawbecker has availed himself of the opportunity to make extensive observations of the species in the region of Watsonville, Santa Cruz County. He stressed the importance of education and action in conservation.

Adjourned.—FRANCES CARTER, *Recording Secretary.*

SOUTHERN DIVISION

APRIL.—The regular annual all-day outdoor meeting of the Southern Division of the Cooper Ornithological Club was held on Sunday, April 26, 1942, at Tapia Ranch County Park, Santa Monica Mountains, Los Angeles County, California, with approximately 150 members and guests present. The formal business meeting was called to order at 2:00 p.m. by President Sherwin F. Wood. Minutes of the Southern Division for February, 1942, were read and approved. The following applications for membership were read: Paul Henry Fairbanks, 2304-A Spaulding St., Long Beach, California, proposed by A. W. Elder; Edward P. Kincaid, Encinitas, California, proposed by Clinton G. Abbott; Enid Reeve Michael, 637 Winona Ave., Pasadena, California, proposed by John McB. Robertson; Frank Arthur Scott, 452 Hillside Ave., Allendale, New Jersey, proposed by W. Lee Chambers; and Dr. Ernest Robert Tinkham, 1335 Woodland Ave., Phoenix, Arizona, proposed by Jack C. von Bloeker, Jr.

President Wood extended a welcome to members of the Audubon Societies, Southwest Bird Study Club, Western Bird-banding Association, and other friends who joined in the outdoor meeting. A call for field reports and recent observations was then made.

George Willett gave a brief report on his recent field trip for the Los Angeles Museum to Death Valley National Monument, California, from which he had just returned. Jack von Bloeker gave a preliminary summarization of the Allan Hancock Foundation expedition to Organ Pipe Cactus National Monument, Arizona. Laurence Peyton made a report on his recent trip to San Fernando Mission, Lower California. Dr. Mary M. Erickson, of the Santa Barbara State College, reported an abundance of Band-tailed Pigeons near Santa Barbara. Walter I. Allen, of Altadena, reported on his recent observations of the Painted Redstart at his feeding station. Dr. Louis B. Bishop, of Pasadena, spoke of "days that were in comparison with days that are"—a comparative survey of changes in bird life over a period of years as noted on his regular annual trips to the eastern United States and returning through Canada, the northern United States, British Columbia, and the Pacific Coast. W. A. Kent gave a report on the birds observed along the ocean shore and in the environs of Tapia Park during the day.

Adjourned.—JACK C. VON BLOEKER, JR., *Secretary.*

For Sale, Exchange and Want Column.—Each Cooper Club member is entitled to one advertising notice in any issue of The Condor free. Notices of over ten lines will be charged for at the rate of 15 cents per line. For this department, address JOHN MCB. ROBERTSON, Buena Park, California.

BIRD REFERENCE work of any kind done at the U. S. National Museum for distant ornithologists. I have full access to the collections and library. Terms: 50 cents per hour. Address: DR. E. M. HASBROUCK, *U. S. National Museum, Washington, D. C.*

WANTED—Bulletin Cooper Ornithological Club, vol. 1 (1899), no. 3; Osprey, vol. 1 (1896), no. 2; Oologist, vol. 28 (1911) and vols. 52-59 (1935-1942).—ALFRED O. GROSS, *Bowdoin College, Brunswick, Maine.*

FOR SALE—Bailey's Handbook of the Birds of the Western United States, *latest revised edition,* priced at $6.00. Two copies for $4.10 each.—F. M. DILLE, *Nogales, Arizona.*

FOR SALE—Bent's "Life Histories of North American Birds": No. 130, $5.00; No. 135, $7.50; No. 142, $4.00; No. 146, $4.00; No. 162, $8.00; No. 167, $5.00; No. 174, $3.00; No. 176, $2.00 (all uncut, as issued). Ridgway's "Birds of North and Middle America": No. 1, $3.00 (paper cover slightly worn); Nos. 5, 6, 7, 8, $2.00 each (No. 7 green cloth, others clean paper covers). Griscom's "The Distribution of Bird Life in Guatemala," as new, $2.00. "Zoe," complete as issued, $4.50. Stephens' "California Mammals," green cloth (autographed copy), $2.50. Postage prepaid in United States.—LAURENCE M. HUEY, *Natural History Museum, Balboa Park, San Diego, California.*